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OF THE

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OBSTETRIC AND GYNECOLOGIC NUMBER

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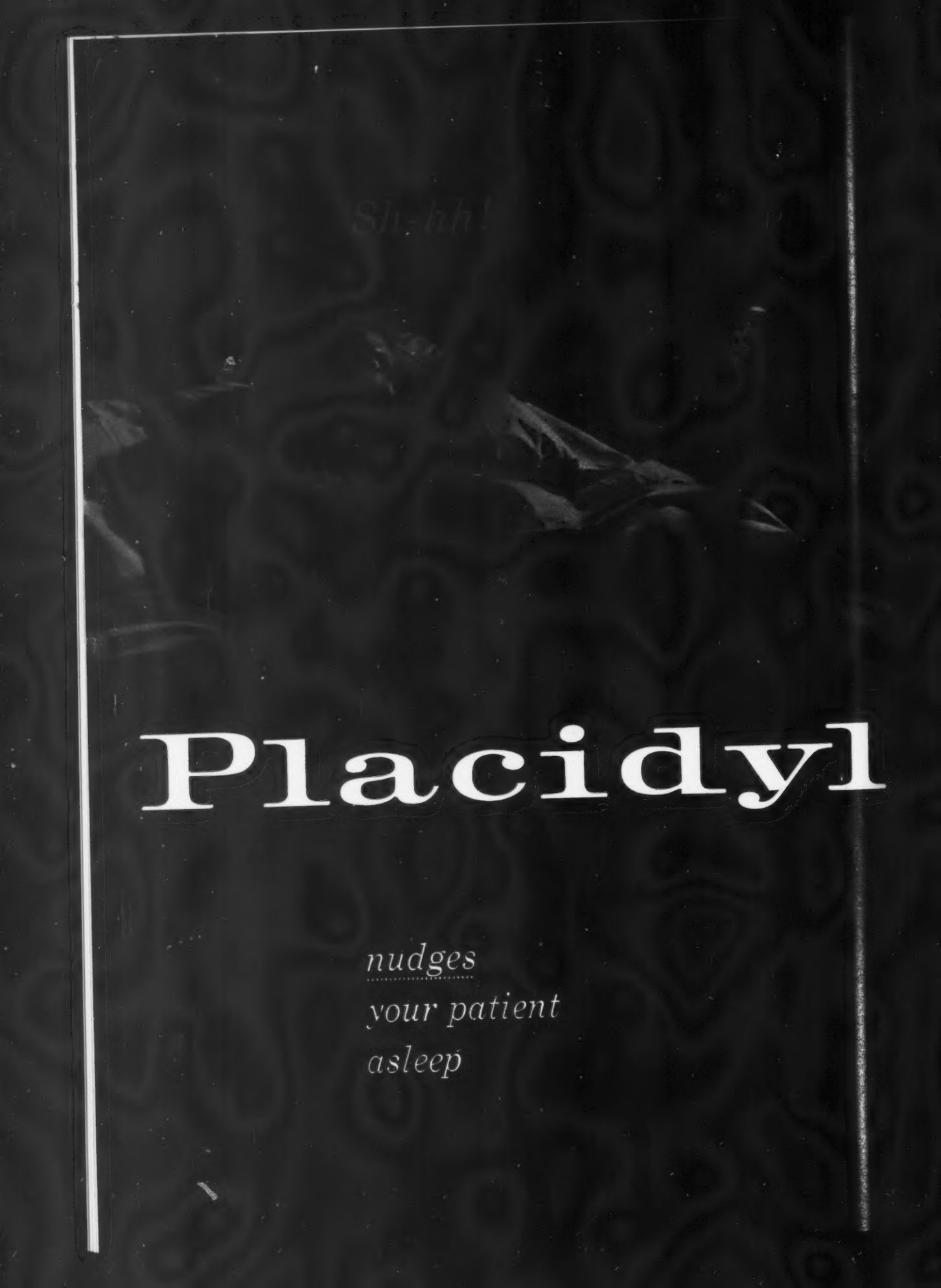
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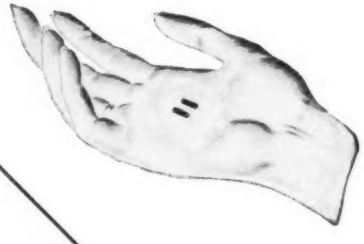

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1. Crunden, A. B., Jr., and Davis, W. A.: Am. J. Obst. & Gynec. 65:311, 1953.
2. Bradley, J. E., et al.: J. Pediat. 38:41, 1951.

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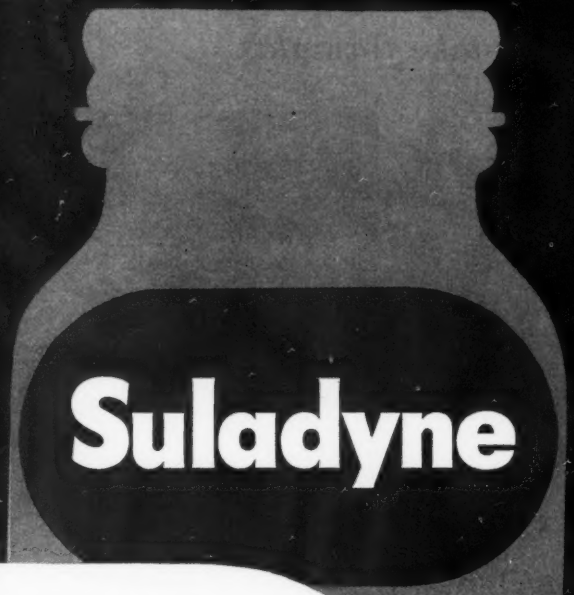

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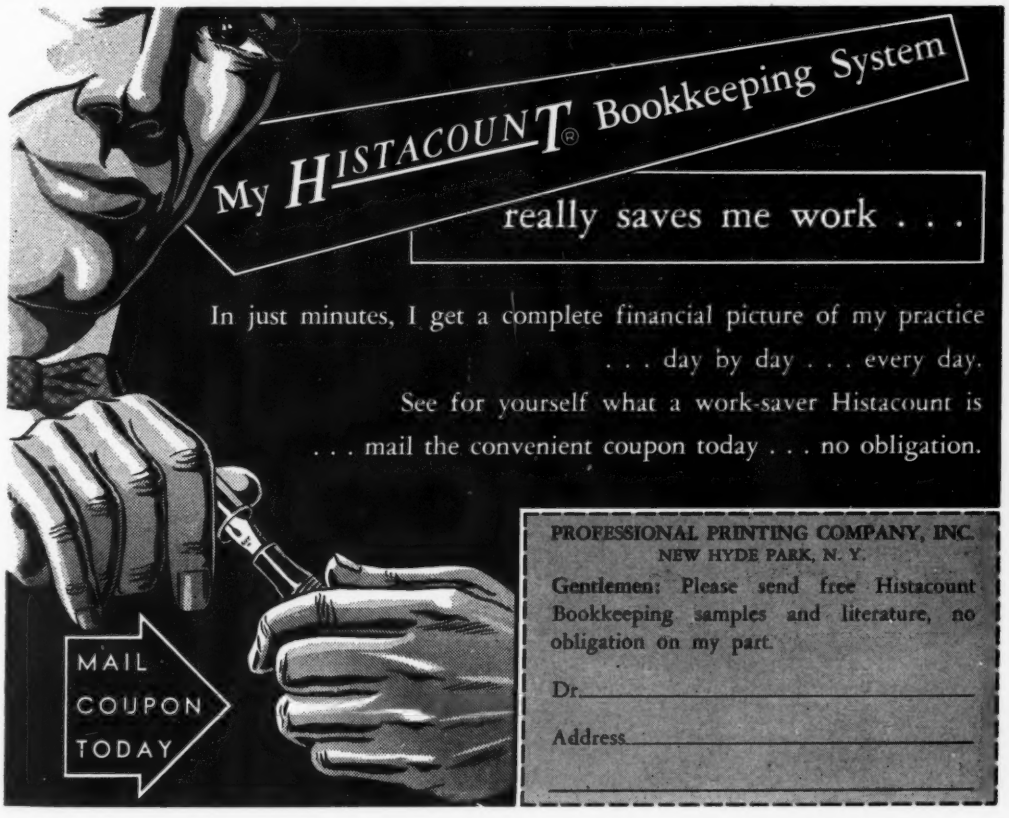
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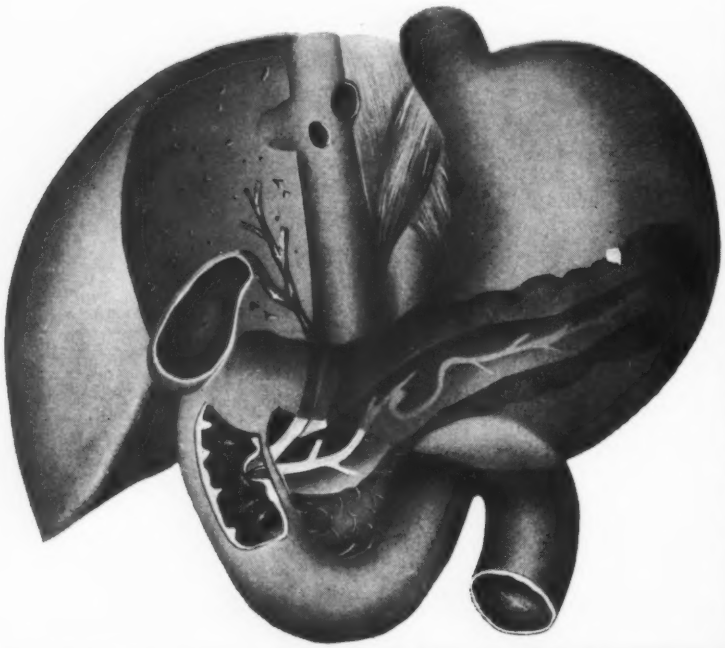

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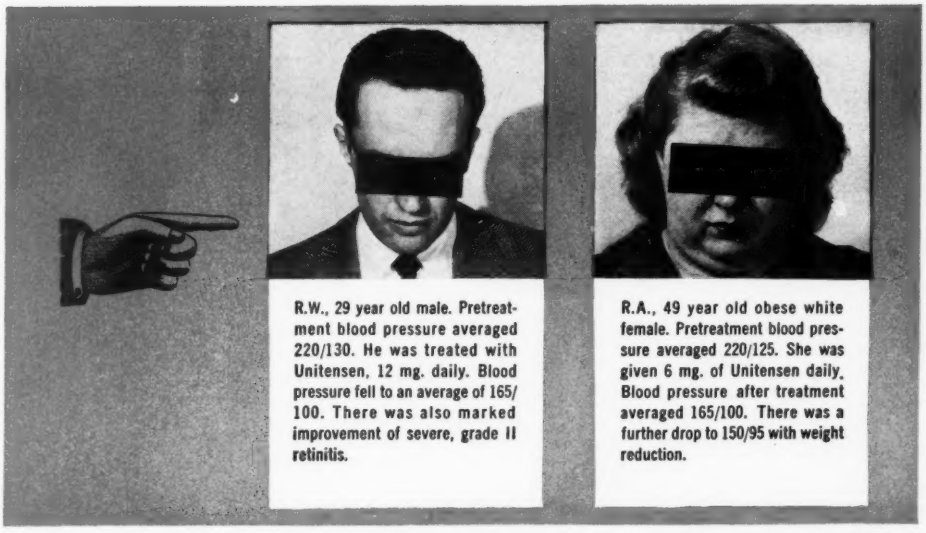

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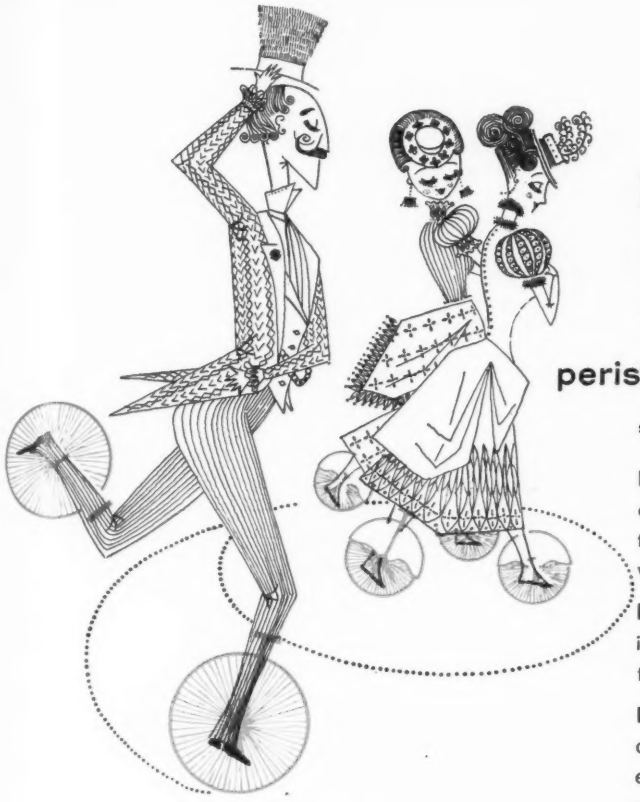

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*Marks, M. M.: Am. J. Digest. Dis. 20:240, 1953.

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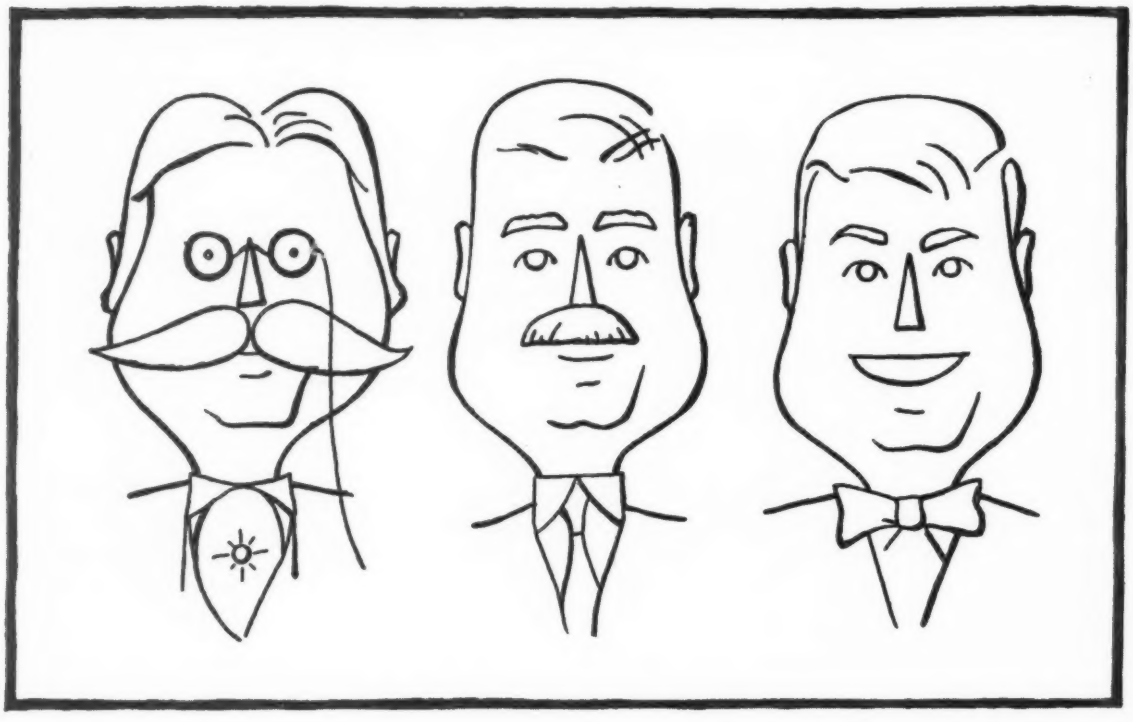

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Bibliography: (1) Bunim, J. J.; Pechet, M. M., and Bollet, A. J.: J.A.M.A. *157*:311, 1955. (2) Waine, H.: Bull. Rheumat. Dis. *5*:81, 1955. (3) Tolksdorf, S., and Perlman, P.: Fed. Proc. *14*:377, 1955. (4) Herzog, H. L., and others: Science *121*:176, 1955. (5) Bunim, J. J.; Black, R. L.; Bollet, A. J., and Pechet, M. M.: Ann. New York Acad. Sc. *61*:358, 1955. (6) Henderson, E.: New developments in steroid therapy of rheumatic diseases, presented at New Jersey State Medical Society Meeting, Atlantic City, New Jersey, April 17-20, 1955. (7) Boland, E. W.: California Med. *82*:65, 1955; abs., Curr. M. Digest *22*:53, 1955. (8) King, J. H., and Weimer, J. R.: A.M.A. Arch. Ophth. *54*:46, 1955. (9) Criep, L. H.: Prednisolone and prednisone in the treatment of allergic diseases, to be published. (10) Sternberg, T. H., and Newcomer, V. D.: Am. Pract. & Digest Treat. *6*:1102, 1955. (11) Gordon, D. M.: Prednisone and prednisolone in ocular disease, to be published.

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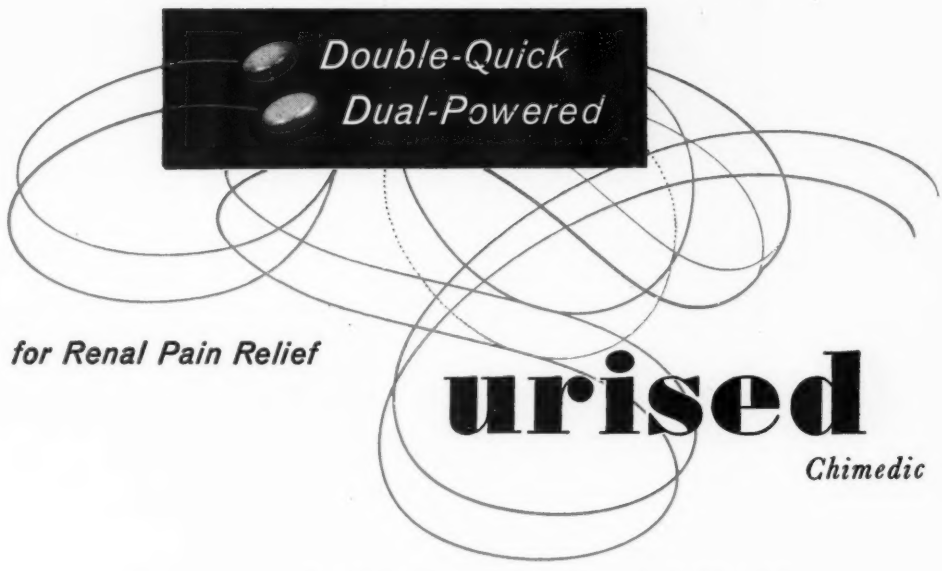

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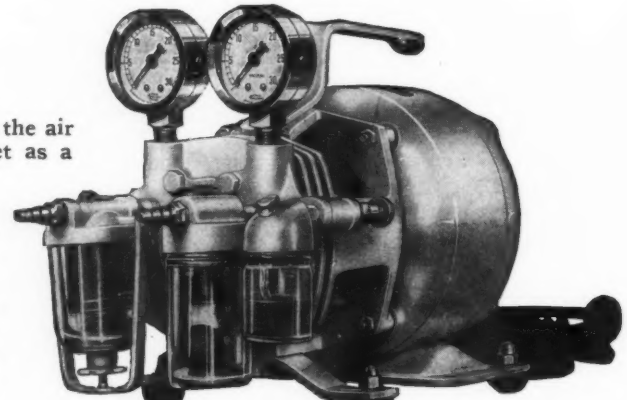

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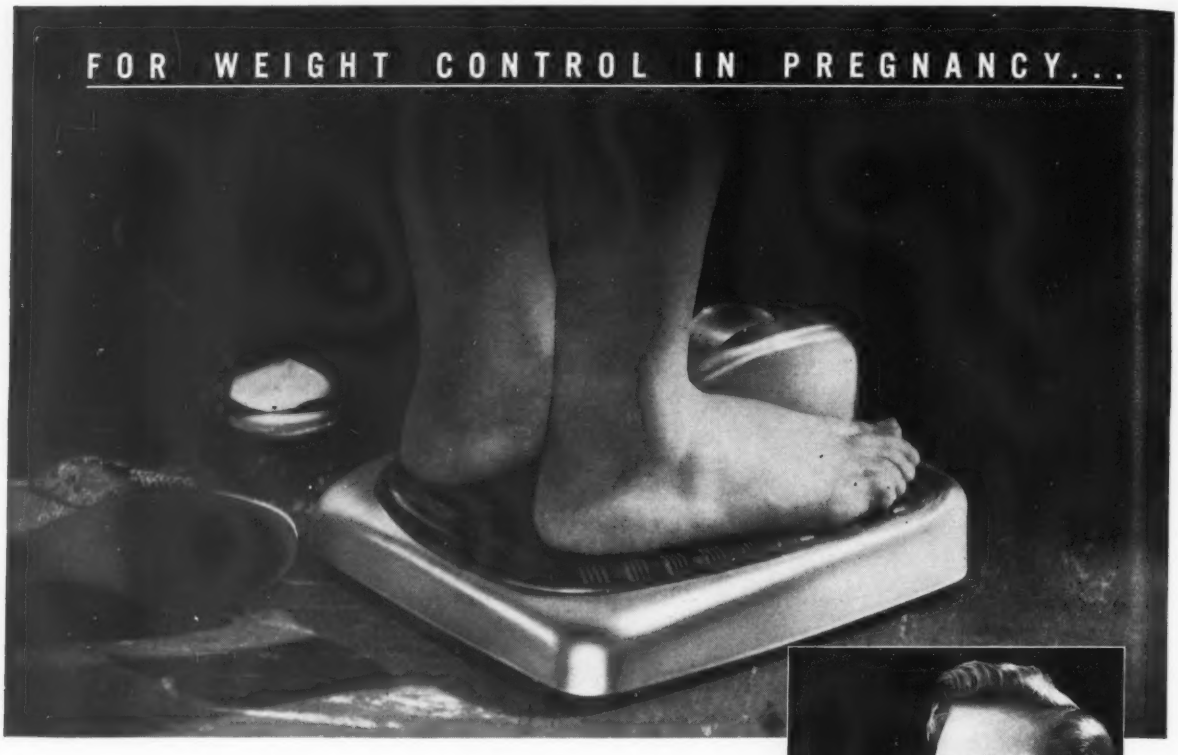

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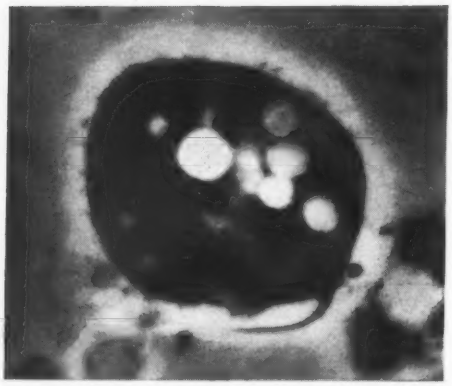
DAVIS TECHNIC USING VAGISEC* JELLY AND LIQUID EXPOSES AND EXPLODES TRICHOMONADS HIDDEN AWAY IN RUGAE



Phase-contrast microscope shows a trichomonad in a mucinous vaginal smear.

MANY trichomoniacides failed in years past largely because they reached only the parasites swimming freely in the vaginal canal—not those hiding under epithelial cells deep among the vaginal rugae. In fact, some agents actually coagulated the albuminous material lining the surface and protected the trichomonads![1]

Success at last. Today, however, you can overcome this problem because VAGISEC jelly and liquid quickly penetrate to trichomonads' hideaways. You can now treat vaginal trichomoniasis successfully, using the Davis technic. Carl Henry Davis, M.D., eminent gynecologist and author, and C. G. Grand, research physiologist, introduced VAGISEC liquid as "Carlendacide" and had it tested by over 100 well-known obstetricians and gynecologists. Dr. Davis states, ". . . over 90% of apparent cures have been obtained. . . ."[2]

Overpowering action. Three surface-acting chemicals in VAGISEC liquid, acting synergistically, not only reach trichomonads but explode them![3] A chelating agent complexes and removes the calcium of the calcium proteinate. A wetting agent removes lipid materials. A detergent denatures the protein. The parasites imbibe water, swell and explode.

The Davis technic.† Dr. Davis recommends a combination of office treatments and home treatments, using both VAGISEC jelly and liquid in home treatments. "A few women have infected cervical, vestibular or urethral glands and require other types of treatment. . . ."[2] It is well to remember the role of the male as carrier of the organism and prescribe protection against re-infection from the husband.[2]

Office treatment. Expose vagina with speculum. Wipe walls dry with cotton sponges and wash thoroughly for about three minutes with a 1:250 dilution of VAGISEC liquid. Remove excess fluid with cotton sponges. Dr. Davis recommends six office treatments, three the first week, two the second, and one the third.

Home treatment. Patient inserts VAGISEC jelly each night and douches with VAGISEC liquid (2 teaspoonfuls in 2 quarts of warm water) each morning except on office treatment days, through two menstrual periods. Continued douching two or three times a week helps to prevent re-infection. Pregnant women should have office treatments only.

Summary. The unique synergistic action of three agents comprising VAGISEC liquid reaches and explodes hidden as well as surface trichomonads. This therapy has a high rate of success and results in fewer flare-ups. VAGISEC jelly and liquid are non-toxic and non-irritating, and leave no messy discharge or stain.

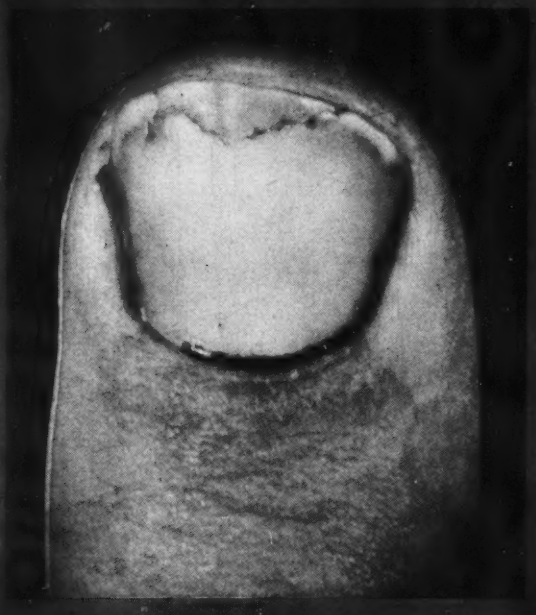
*VAGISEC is the trade-mark of Julius Schmid, Inc. †Pat. App. for

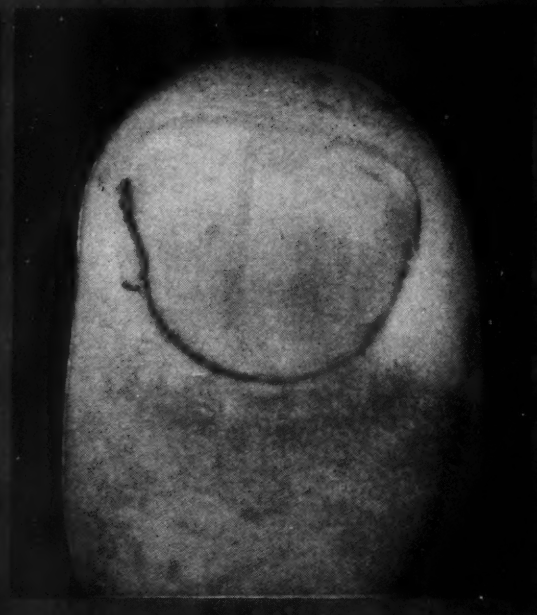
JULIUS SCHMID, INC.
gynecological division
423 West 55th Street New York 19, N. Y.

Active ingredients: Polyoxyethylene nonyl phenol, Sodium ethylene diamine tetra-acetate, Sodium dioctyl sulfosuccinate. In addition, VAGISEC jelly contains Boric acid, Alcohol 5% by weight.

1. Davis, C. H.: Am. Jour. Obst. & Gynec. 68:559 (Aug.) 1954.
2. Davis, C. H.: West. J. Surg. 63:53 (Feb.) 1955.
3. Davis, C. H.: J.A.M.A. 157:126 (Jan. 8) 1955.

KNOX Protein Previews





New Study Shows Gelatine Restores Brittle Fingernails to Normal

Directions for making the Knox Gelatine drink in every package

Brittle, fragile or laminating fingernails are the bane of many a woman's existence. Yet this highly prevalent and distressing condition often has gone uncontrolled for lack of effective therapy. Now, you can promise these patients substantial relief in a large percentage of cases.

In a recent study[1] that confirmed previous work[2] Knox Gelatine was used to treat 36 women with fragile, brittle, laminating fingernails. The response was most gratifying. Except for three patients who discontinued the therapy, three diabetics, and two women who had congenital deformities, the splitting ceased and all other patients were able to manicure their nails to a full point by the time the study ended.

Optimal dosage proved to be one envelope (7 grams) of Knox Gelatine administered daily for three months. Improvement, however, was noted after the first month. If you would like more complete details of this work, just use the coupon below.

1. Rosenberg, S. and Oster, K. A., "Gelatine in the Treatment of Brittle Nails," *Conn. State Med. J.* **19**:171-179, March 1955.
2. Tyson, T. L., *J. Invest. Dermat.* **14**:323, May 1950.

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Please send me a reprint of the article by Rosenberg and Oster with illustrated color brochure.

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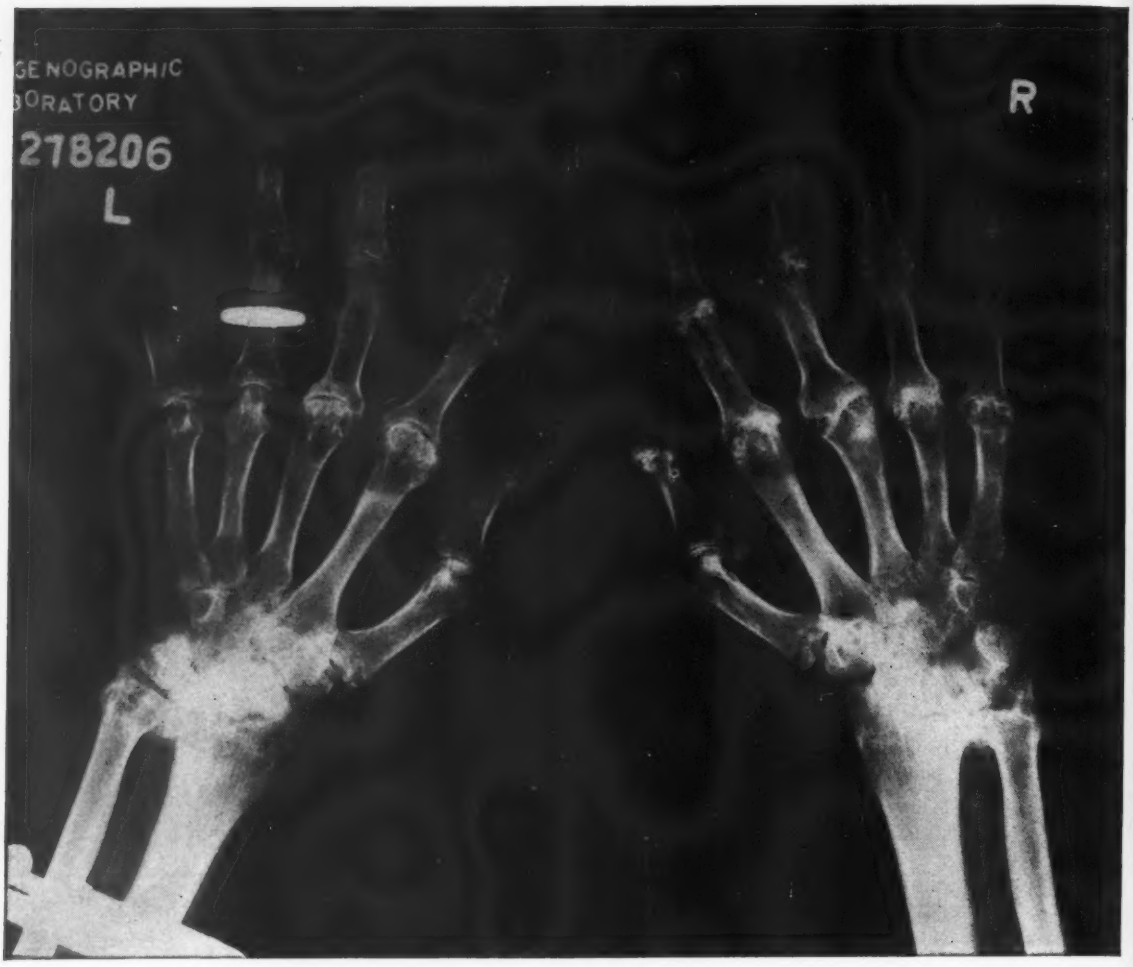

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References: 1. Fremont-Smith, P.: J.A.M.A. 158:386, 1955. 2. J.A.M.A. 141:124, 1949. 3. M. Times 81:41, 1953.

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A	5000 USP Units
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B_1	2 mg.
B_2	2 mg.
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DOSE: 1 TABLET DAILY

SUPPLIED:

BOTTLES OF 50 and 100 TABLETS

Enriched Bread...

and the Capacity to Work and Enjoy Life

NUTRITION EDUCATION, as important as it is, perforce is slow in effecting public health gains; practical measures on a national scale, on the other hand, can effect such gains quickly.[1] An outstanding example of practical measures for helping to overcome malnutrition has been the broad commercial enrichment of white bread initiated in 1941.

By enrichment according to official regulations, white bread became an important food for supplying thiamine, riboflavin, niacin, and iron to the national dietary.[2] Supplementing enrichment in these nutrients, nonfat milk solids are added in amounts averaging 4 per cent (by weight) of the flour component.[3] Such enriched bread is valuable not only for its contained B vitamins and iron, but for its calcium[4] and its good quality protein[5] as well.

Mortality and morbidity of nutritional deficiency diseases have dropped markedly since the advent of commercial enriched bread. No stronger evidence can be cited than the virtual elimination of pellagra in our population in recent years.[1] In 1937, pellagra mortality was 2.5 per 100,000. By 1951 it had dropped to 0.1, representing an unprecedented low of 208 deaths reported in the entire country.

But a fall in mortality data reflects only in small measure the true improvement in public health resulting from the nutritional betterment of the national dietary.[1] Of greater concern is the vast number of people who, as a result, enjoy better health with increased capacity to work and enjoy life.

1. Sebrell, W. H.: Developing Modern Nutrition Programs, Public Health Reports, United States Department of Health, Education, and Welfare *69*:277 (Mar.) 1954.
2. Jolliffe, N.: The Pathogenesis of Deficiency Disease, in Jolliffe, N.; Tisdall, F. F., and Cannon, P. R.: Clinical Nutrition, New York, Paul B. Hoeber, Inc., 1950, p. 22.
3. Cook, H. L., and Halvorson, H.: Industrial Uses and Preferences for Nonfat Dry Milk Solids, Wisconsin Agricultural Experiment Station and United States Department of Agriculture, Research Bull. 169, 1950.
4. Goddard, V. R., and Marshall, M. W.: The Calcium Content of Commercial White Bread, United States Department of Agriculture, Technical Bull. 1055, 1952.
5. Sherman, H. C.: Chemistry of Food and Nutrition, ed. 8, New York, The Macmillan Co., 1952, pp. 212, 599.

The nutritional statements made in this advertisement have been reviewed and found consistent with current medical opinion by the Council on Foods and Nutrition of the American Medical Association.

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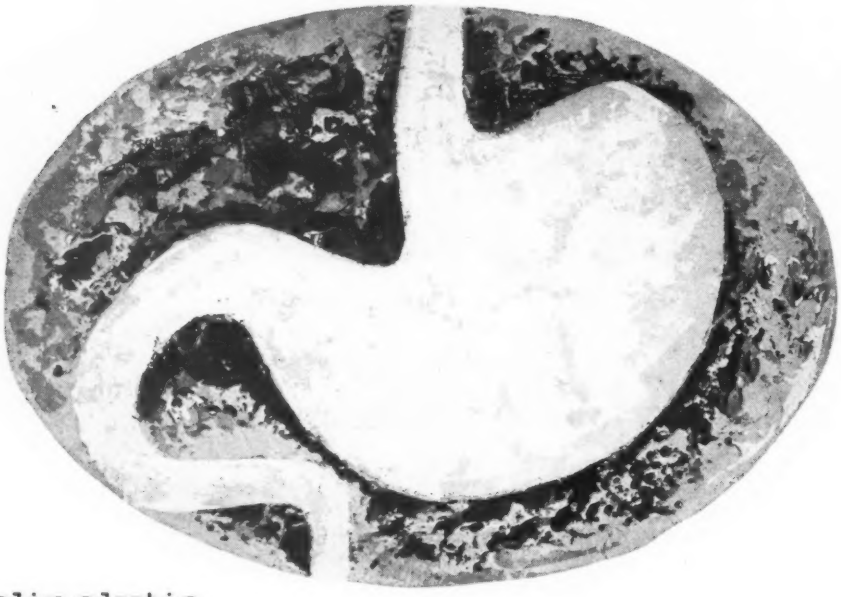

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- minimal effect on bowel and bladder
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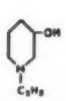
Lakeside Laboratories, Inc., Milwaukee 1, Wisconsin PIONEERS IN PIPERIDOLS



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Vol 55, No. 2 October, 1955

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The R-Center Method

A New Method for Analyzing Vertebral Motion by X-Rays

PAUL ROSENBERG

President, Paul Rosenberg Associates
Consulting Physicists

Mount Vernon, New York

Accurate information concerning the motion of human vertebrae exists inherently in serial x-rays of the spinal column taken in successive postural positions, and in cinefluorographs of the spine. Nevertheless no method has been available heretofore for extracting this information reliably and accurately, and for analyzing the vertebral motions kinematically. This paper reports the development of a geometric method called the R-center method for doing so.

The following brief definitions of terms used in this paper are given for the convenience of the medical reader who is not conversant with the kinematic terminology used by physicists and mathematicians. A *rigid body* is a portion of matter in which the distance between every pair of particles remains constant. The *displacement* of a rigid body is its change of position; the displacement is called a *rotation about a straight line* if the position in space of every point of the body which lies on the straight line is unchanged, or if the (perpendicular) distances from the straight line to all points of the body are unchanged; the displacement is called a *rotation about a point* if the position in space of that point of the body is unchanged, or if the distances between that point and all points of the body are unchanged; the displacement is called a *translation* if all points of the body move in a set of straight lines parallel to each other. In general, the displacement of a body consists of one or more rotations combined with one or more translations.

Previous investigators[1] have measured the angles through which the vertebrae turn by superposing the images of corresponding vertebrae in successive serial x-rays; in this way some investigators have constructed the so-called "spinal curve" by drawing tangents to the vertebral bodies. In all such previous investigations, the rotation (in the kinematic sense) was the only aspect of the displacement that was measured or analyzed. The present paper reports the development of a simple geometric method (called the R-center method) for analyzing and measuring the entire displacement of the vertebrae, including rotation and translation, using either serial x-ray photographs or cinefluorographs.

The R-center method is based upon the kinematic theorem,[2,3] sometimes called Euler's theorem, which states that any displacement of a rigid body, such that every particle of the body is displaced parallel to a given plane, can be produced by rotation about an axis perpendicular to the plane. This "resultant" axis will be called the R-axis. The foregoing is true regardless of the combinations of translation and rotation which compose the displacement. A corollary of the foregoing theorem is: Any displacement of a plane body (or plane figure) in its own plane, regardless of the combination and sequence of translations and rotations that make up the displacement, can always be produced (represented, described, or specified) by a simple rotation around a properly selected point in the plane. An alternative way of stating this corollary is: If any two positions of a plane body in its plane are given, the displacement from one position to the other can be regarded as a rotation about some point in the plane. This point is called the R-center.

To prove this corollary, let A_1 and B_1, in Figure 1, be any two points fixed with respect to a plane body which is displaced in its plane. (A_1 and B_1 may be either in or outside the body provided only that they are fixed with respect to the body, that is, the distances between A_1 and B_1 and all other points of the body remain invariable). Let the positions of A_1 and B_1 after the displacement be A_2 and B_2 respectively. Construct aa, the perpendicular bisector of A_1A_2; likewise construct bb, the perpendicular bisector of B_1B_2. Let R denote the intersection of aa and bb.

$$RA_1 = RA_2 \text{ and } RB_1 = RB_2$$

because R is on the perpendicular bisectors of A_1A_2 and of B_1B_2. Furthermore $A_1B_1 = A_2B_2$ because the body is rigid. Therefore triangle RA_1B_1 is equal to triangle RA_2B_2 in all respects; and triangle RA_1B_1 can be brought into the position of triangle RA_2B_2 by rotation about the point R through an angle $A_1RA_2 = B_1RB_2$. The point R is therefore the required R-center.

Consider a set of serial x-ray negatives of the spine taken in lateral views with the subject in successive postural positions of complete extension, mid-extension, upright posture, mid-flexion, and complete flexion (denoted respectively by the symbols E, ME, U, MF, and F); and consider the corresponding displacements of any given vertebra (which is a rigid body

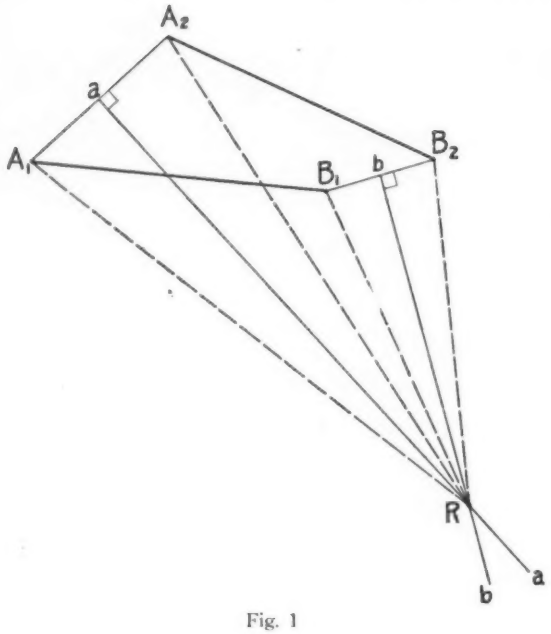

Fig. 1

in the mechanical sense). Every particle in the vertebra is displaced parallel to the sagittal plane. Therefore the theorem stated in the preceding paragraph can be applied, that is, the displacement of the vertebra can be produced by rotation about an axis (R-axis) perpendicular to the sagittal plane.

The displacement of the image of the vertebra in the plane of the x-ray negative obviously represents the displacement of the vertebra, because the plane of the x-ray negative and the sagittal plane are parallel to each other, and because the image of the vertebra on the negative is composed of points projected perpendicular to the sagittal plane from particle points in the vertebra. By the corollary stated above, the displacement of the vertebral image on the negative can be produced by a rotation about the R-center in the plane of the negative. This R-center is the intersection of the R-axis with the plane of the negative.

Consider the analogous set of serial x-ray negatives of the spine taken in anterior-posterior views with the subject in successive postural positions of complete left lateral bending, mid-left lateral bending, upright posture, mid-right lateral bending, and complete right lateral bending (denoted respectively by the symbols L, ML, U, MR, and R). If axial rotation of the vertebrae (rotation about a "vertical" axis) is neglected, the R-center for the image of each vertebra on the negative represents the displacement of the vertebra in the same way as does the R-center in the case of the lateral x-ray plates.

It should be emphasized that the vertebra does *not necessarily* rotate about the R-axis during the actual displacement. The actual displacement may consist of one or more translations combined with one or more rotations about a series of entirely different axes. The R-axis is simply the axis about which the vertebra could be rotated to produce the same *resultant displacement* as that actually experienced by the vertebra.

Since the displacement of the x-ray image in its plane is the same as the displacement of the vertebra parallel to this plane, and since the R-center lies on the R-axis, we shall for convenience henceforth refer to the R-center instead of the R-axis, and we shall speak of the vertebra as rotating about the R-center.

The vertebral mechanics with which we are concerned are essentially problems of statics. Except under violent circumstances, the rate of change of momentum of the vertebrae is so small that only the static forces are significant. There is therefore no purpose in choosing an inertial frame of reference (coordinate system). To a good first approximation, the forces with which we are concerned are the forces exerted by each vertebra upon its immediately adjacent vertebrae. Consequently there is little or nothing to be gained, in a study of the mechanics of the vertebrae, by selecting the x-ray cassette or the floor of the room as a frame of reference; indeed these arbitrary frames of reference, which are commonly selected, complicate the interpretation of data and permit the introduction of errors due to motion of the subject's body as a whole with respect to the x-ray equipment between exposures. The most significant and simple frame of reference to select to describe the motion of any given vertebra is a frame of reference fixed with respect to an adjacent vertebra. We have therefore chosen the convention of expressing the motion of any given vertebra with respect to the next inferior vertebra. For example, the R-center for the first lumbar vertebra, L1, describes the displacement of L1 with respect to L2; the R-center for L2 describes the displacement of L2 with respect to L3; et cetera.

Kinematically, the R-center is significant for the following reasons, among others:

1. The R-center, together with its corresponding angle of rotation, completely specifies (describes) the resultant displacement of the vertebra regardless of the complicated rotations and translations which may have combined to produce the displacement.

2. For very small (differential) displacements, the R-center becomes the instantaneous center of rotation. In the limit, as the displacements become smaller, the locus of the corresponding R-centers becomes the locus of the instantaneous centers of rotation; that is, in the limit, the R-centers lie on the centrode (defined in kinematics as the curve described by the instantaneous center of rotation of a plane figure moving in its own plane).

Medically, the potential value and significance of the R-center method are:

1. The R-center method is a powerful research tool for the analysis and study of the kinematics and mechanics of the spine.

2. The positions of the R-centers, together with their associated angles of rotation, may prove to be a valuable means for diagnosing disorders in the motions of the vertebrae.

3. The R-center and the R-center angle can be determined in the clinic or in the physician's office by a procedure (described below) which is simple enough to be carried out by a technician. (Interpretation of the R-center findings would doubtlessly remain the responsibility of the physician.)

A description will now be given of the procedure for determining R-centers for lumbar vertebrae from anterior-posterior serial x-ray negatives; it will be apparent that the same general procedure is applicable to all vertebrae in anterior-posterior and lateral views. We shall use the symbol LU to refer to the displacement from complete left lateral bending to upright posture;

UR for the displacement from upright posture to complete right lateral bending; LR for the displacement from complete left to complete right lateral bending. (When discussing forward and backward bending, EU will refer to the displacement from complete extension to upright posture; UF from upright to complete flexion; EF from complete extension to complete flexion). For brevity, the procedure will be described simply for the LU, UR, and LR R-centers; the mid-position R-centers (that is, the L-ML, ML-U, U-MR, and MR-R R-centers) are determined by the same procedure, as will be self-evident.

An 18×24 inch sheet of tracing paper* is placed over the 14×17 inch frosted glass viewing panel of a conventional x-ray illuminator lying flat on a table. The illuminator is equipped with four 15 watt fluorescent lamps instead of the usual two lamps. The U x-ray negative is placed over the tracing paper, and the corners of the negative are taped to the paper with drafting tape.† The L negative is placed on top of the U negative and the images of the first lumbar vertebra are superposed (or "matched," in the parlance of the laboratory). Registry points are then pricked through the two negatives and the tracing paper by a needle‡ at three arbitrary points chosen for convenience near the outside boundaries of the negatives. It is desirable, for the sake of accuracy, that these three registry points be selected to lie roughly at equal distances from L3, and roughly at 120 degrees apart from each other with respect to L3. These registry points serve a twofold purpose: first, they register the U negative to the paper so that the negative can be replaced in the exact same position on the paper at any later time after the tape has been removed; second, the registry points on the L negative and on the paper record the position for a

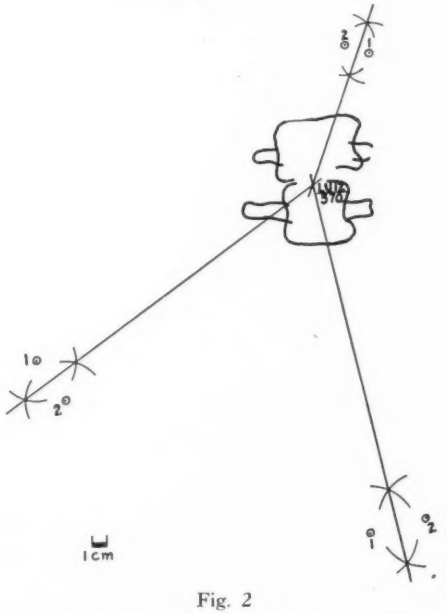

Fig. 2

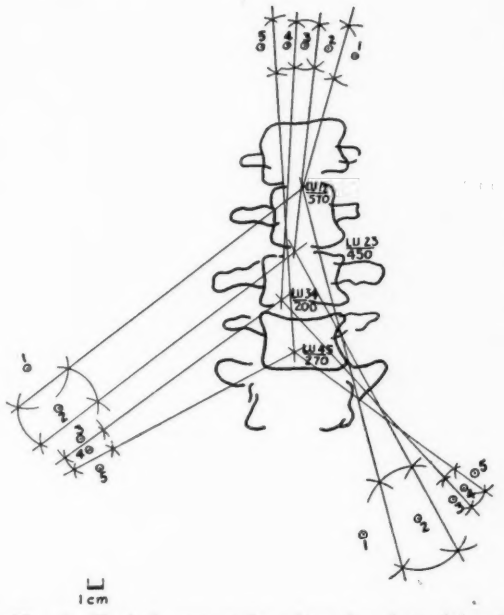

Fig. 3. Typical construction sheet for determining LU R-centers, lumbar spine, anteroposterior view, subject number 22.

"match" of the first lumbar vertebra. To avoid possible confusion later, the registry points should be identified by small circles drawn freehand with a colored pencil around each pricked needle point.

With the U negative still taped to the paper, the images of the second lumbar vertebra are then matched to each other. The needle is then pressed through each of the three registry points of the L negative, piercing through the U negative to the paper.

The LU R-center can now be determined for the first lumbar vertebra by removing both negatives from the paper and constructing the perpendicular bisectors of the three lines joining the first and second positions of each registry point on the paper. Figure 2 is a diagram of the situation at this stage of the procedure. (The approximate outlines of the vertebral bodies are shown in Figures 2, 3, and 4 for purposes of illustration only, to indicate the relative locations of the vertebrae and the geometric constructions.) The three points labeled 1 are the first three points that were pricked, namely, the registry points; they correspond to the L1 matching, that is, the matching of the images of the first lumbar vertebra. The three points labeled 2 are the points that were pricked when the images of L2, the second lumbar vertebra, were matched. Three perpendicular bisectors are constructed, one for each pair of 1-2 points, by the conventional Euclidean method (pairs of intersecting arcs of equal radii are drawn by a compass with its pivot placed successively at each pricked point). The point of intersection of the three perpendicular bisectors is the R-center of the LU displacement of L1 with respect to L2.

Mathematically, only two perpendicular bisectors are required to determine the R-center, and hence only two registry points and two pairs of 1-2 points are required. (Perpendicular bisectors from additional pairs of 1-2 points, obtained from additional registry points, will all intersect at the same R-center, regardless of how many other registry points are chosen and regardless of where they are chosen on the negatives; this

*Any good grade of tracing paper suffices. The paper which happens to be in use in the PRA laboratory is "Bolton no. 183 tracing paper, blue tint, medium thick, unglazed tooth surface, extra transparent" obtained from Eugene Dietzgen Co.

†A pressure sensitive paper tape, easily and quickly removable from both paper and film, for example, tape no. 230, 1 inch wide, manufactured by Minnesota Mining and Manufacturing Co., St. Paul 6, Minnesota.

‡A common sewing needle or an old-fashioned steel phonograph needle held in a mechanic's hand pin vise is a convenient tool for this purpose. The point of a draftsman's dividers or compass also can be used.

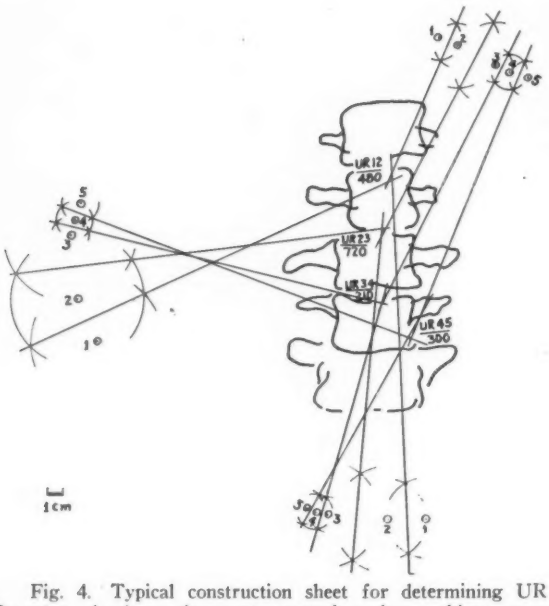

Fig. 4. Typical construction sheet for determining UR R-centers, lumbar spine, anteroposterior view, subject number 22.

follows from Euler's theorem, discussed earlier in this paper.) Nevertheless, three perpendicular bisectors (from three registry points and three pairs of 1-2 points) are used in the R-center determination for the practical reason that the third perpendicular bisector provides a check upon the drafting precision, that is, upon the mechanical precision with which the technician or draftsman manipulated the needle, compass, straightedge, and pencil during the geometric construction. When the three perpendicular bisectors do not meet perfectly in a point, they meet to form a triangle as shown, for example, at some of the R-centers in Figure 4. This triangle results from imperfect drafting. The triangle is *not* produced by any errors in matching the vertebral images. Errors in matching will introduce errors in the location of the R-center but will never be the cause of a triangle of intersection. With perfect drafting, the three perpendicular bisectors will always intersect sharply at a point regardless of how poor the matching may be. The size of the triangle indicates the drafting precision. For practical purposes it is quite sufficient to require that the greatest dimension of the triangle be ¼ inch or less; this gives ample precision for the determination of the R-center at the present stage of the research work. The R-center lies at the centroid, or "center of gravity" of the triangle.

The resultant angle of rotation of L1 around its R-center is the angle subtended by any pair of 1-2 points (Fig. 2) with respect to the R-center; all three pairs of points subtend the same angle. This angle corresponds to the angle $A_1RA_2 = B_1RB_2$ in Figure 1. A simple protractor suffices to measure the angle for ordinary purposes; for more accurate and more convenient measurement, the protractor mechanism of a drafting machine is used in the PRA laboratory. If the drafting has been done carefully, and if the triangle is satisfactorily small, it is sufficient to measure the angle for only one of the three pairs of points. Comparison of measurements of the angle for two or three pairs of points serves only to indicate the precision of the drafting work; if these two or three measurements are made, their unweighted average is taken as the resultant angle. The angle is expressed in minutes for convenience (the use of the minute as a unit does *not* imply that the precision or accuracy of the angle determination is of the order of magnitude of a minute of arc). The measured value of the resultant angle, in minutes, is recorded directly on the sheet of tracing paper near the R-center in the following convenient manner: The number of minutes is written below a short horizontal line (as though the number were the denominator of a fraction); the identity of the R-center is written above the line (as though it were a numerator) by giving the letter symbols corresponding to the displacement and the number symbols corresponding to the two vertebrae concerned. Thus in Figure 2 the symbol $\frac{570}{LU12}$ says: This is the R-center for the complete-left-to-upright displacement of the first lumbar vertebra with respect to the second, and the resultant angle is 570 minutes of arc. As another example, the symbol $\frac{EF45}{867}$ written alongside an R-center in a set of lateral x-ray views of the cervical spine would signify that this was the R-center for C4 with respect to C5 during displacement from complete extension to complete flexion, and that the resultant angle of displacement was 867 minutes. (It is recognized that including the numeral representing the inferior of the two vertebrae concerned is redundant, and that the numeral of the superior vertebra would suffice in the symbol: For example, $\frac{EF45}{867}$ could be written $\frac{EF4}{867}$; nevertheless, the double numeral notation is recommended for use at the present time when the R-center method is still new, in order to emphasize that the R-center and its resultant angle refer to the displacement of a vertebra *with respect to its inferior adjacent vertebra*. Eventually, when this kinematic viewpoint is well understood, the single numeral notation can be used.)

Thus far, the procedure has been described for determining the LU12 R-center. To determine the LU23 R-center, consider the U negative to be retaped to the paper in its original position with the registry points coinciding; then superpose the L negative, match the images of the third lumbar vertebra, and prick the needle through the three registry points of the L negative into the paper; these points are identified with the numeral 3, signifying the position of match for the third vertebra; construct the perpendicular bisectors of the three lines joining each of the three pairs of 2-3 points, as in Figure 3; the intersection of these three perpendicular bisectors is the LU23 R-center. The LU34 R-center is determined in the same way, namely, by matching the images of the fourth vertebra, establishing three points identified with the numeral 4 (as in Figure 3), and constructing the perpendicular bisectors. The LU45 R-center is obviously determined by the same procedure, through a matching of the fifth vertebra.

For clarity of exposition, the foregoing procedure has been described as though the negatives were removed from the paper after each matching, the perpendicular bisectors for that matching being constructed before the next vertebra is matched. The actual procedure, which is more efficient and much less time consuming, is to do all the matchings (and corresponding needle punchings) one after the other, without removing the U negative from its paper; finally, when the U

negative is removed from the paper, the perpendicular bisectors are constructed for all the vertebrae at the same time. The result is as shown in Figure 3. (The diameters of the points and the widths of the lines in Figures 2, 3, and 4 have been exaggerated for readability. Much finer points, lines, and arcs are used on the actual work sheets to attain precision.)

The UR R-centers are now determined by the same procedure as for the LU R-centers, the R negative replacing the L negative. It is convenient to use the same registry points on the U negative as were used in the LU procedure. A typical result is shown in Figure 4. Although the LU and UR constructions are shown separately for clarity in Figures 3 and 4 respectively, in actual practice the same sheet of paper (a "U sheet") is used for both constructions; that is, the geometric constructions of Figures 3 and 4 appear on the same sheet.

The LR R-centers are next determined by the same procedure as for the LU R-centers, the R negative replacing the U negative. Again it is convenient to use the same registry points. The LR geometric constructions are done on a new sheet of paper (an "R sheet") to avoid confusion. The LR R-centers are then transferred from this R sheet to the U sheet containing the LU and UR R-centers, by superposing the R sheet on the U sheet, and registering each vertebra in turn by means of the registry points.

All the R-centers for LU, UR, and LR are thus collected on the U sheet of paper, now called a "summary sheet," such as shown in Figure 5. The approximate outlines of the vertebrae are added by tracing from the U negative (which is oriented with respect to the paper by means of the registry points). The summary sheet contains all the R-center information, including the resultant angles, in one graphic diagram. In the laboratory, the R-centers and their identifying symbols are coded with colored pencil for additional clarity; all LU and EU R-centers are colored blue; UR and UF are green; LR and EF are red. The letters may then be omitted from the identifying symbols alongside each R-center. The color coding aids in visualizing and studying the arrangement or "pattern" of R-centers.

The EU, UF, and EF R-centers, and their angles, are determined from the lateral view x-ray negatives by a procedure which is identical to that used for the LU, UR, and LR R-centers respectively. The description given above for the LU, UR, and LR determinations can be converted word for word into a description for the EU, UF, and EF determinations by substituting the letters E and F for L and R respectively. An example of an R-center summary sheet for the lateral view is given in Figure 6.

The largest experimental errors in determining the R-centers and the R-center angles arise in the matching procedure, and are due to the ambiguities of the x-ray images of the vertebrae. Clear, distinct outlines of vertebrae on the x-ray negatives are obviously desirable for the R-center method, and are necessary for good precision in an R-center determination. In the earlier stages of this research work matchings were made first by tracing the vertebral outlines from the negative onto tracing paper, and then matching the traced outlines; other experimental matchings were made by outlining the vertebrae on the negatives with pen or grease pencil of contrasting color; still other experimental matchings were made by drawing tangents to the four sides of the image of each vertebral body, and then matching the tangents; a variation of the last experimental procedure

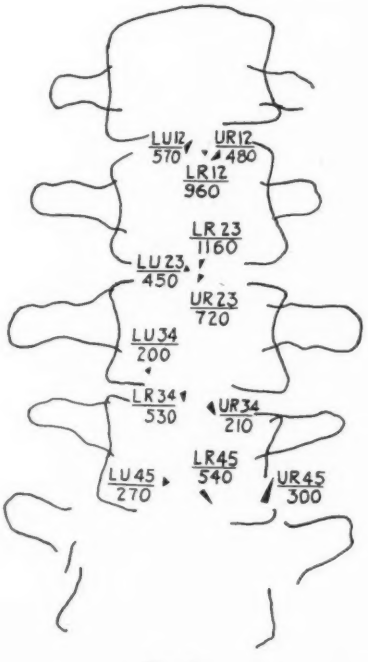

Fig. 5

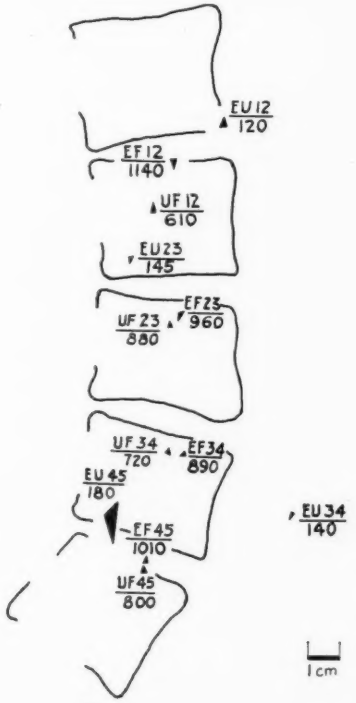

Fig. 6

Fig. 5. R-center summary sheet, subject number 22, lumbar spine, anteroposterior view. Fig. 6. R-center summary sheet, subject number 22, lumbar spine, lateral view.

was to match only the four points of intersection of the four tangents. None of these matching methods appeared to give precision and reproducibility as high as did the method now adopted, namely, the method of superposing the two negatives upon each other and matching the x-ray images directly; furthermore the method of direct superposition is simpler and less time consuming.

The reproducibility of the R-center determinations by different observers, and from time to time by the same observer, is dependent largely upon the aforementioned clarity and sharpness of the vertebral outlines in the x-ray negatives that are being matched. Data concerning this reproducibility in the lumbar area was taken in this laboratory from thirteen cases in which the x-ray photographs were of moderate quality only. The observers were a physicist and an engineer, both of whom can be considered untrained technicians as regards ability to interpret x-ray plates anatomically. For each subject, distances were measured between corresponding R-centers determined by the two observers independently, and by the same observer upon different occasions. Seventy-five per cent of these distances were less than 2 cm. This reproducibility will improve with sharper x-ray photographs and with further refinements of technique. Nevertheless the present reproducibility is sufficient for the current and immediate future phases of this exploratory research work, in which even the approximate location of each R-center is significant.

Theoretically, the LR resultant angle for each vertebra should equal the sum of the LU and UR angles for that vertebra; and the EF resultant angle for each vertebra should equal the sum of the EU and UF angles for that vertebra. The results to date confirm this within the experimental error of the angle determination. This is illustrated by the angles in the summary sheets of Figures 5 and 6, despite the fact that in this case the x-ray plates did not give sharp vertebral outlines such as are required for precision determination of R-centers and their angles.

A zero resultant angle (zero R-angle) means either that the displacement is a pure translation with no rotation, or that the two vertebrae concerned are ankylosed. In the former event there will be an appreciable separation between the successive positions of the registry points on the construction sheet, but the perpendicular bisectors will be parallel; that is, they will "meet at infinity" (where the R-center may be said to be located). In the limited number of subjects examined by the R-center method to date, there have been no verified cases of an R-center at infinity, that is, no instances of pure translation without rotation.

However, there have been several instances in which the R-center determinations have shown vertebrae to be ankylosed, that is, instances in which the R-angle is equal to zero within the experimental error, with negligible separation between the two successive positions of the registry points. A separation of ⅛ or ¼ inch is considered negligible, and an R-angle less than 45 minutes is taken as zero, because these values seem to be within the present experimental error of the R-center method with x-ray plates of mediocre quality. These values have been adopted tentatively, pending the accumulation of more extensive data for a better statistical evaluation of the precision and accuracy of the method. When the R-angle and the separation of points are found to be zero by the foregoing criteria, this fact is noted in the margin of the R-center summary sheet by writing the symbol representing the displacement inside a small circle; examples are EF12, UF12, and EU45 in Figure 8; LU34 and LU45 in Figure 9; and UR12 in Figure 11. (Occasionally a verte-

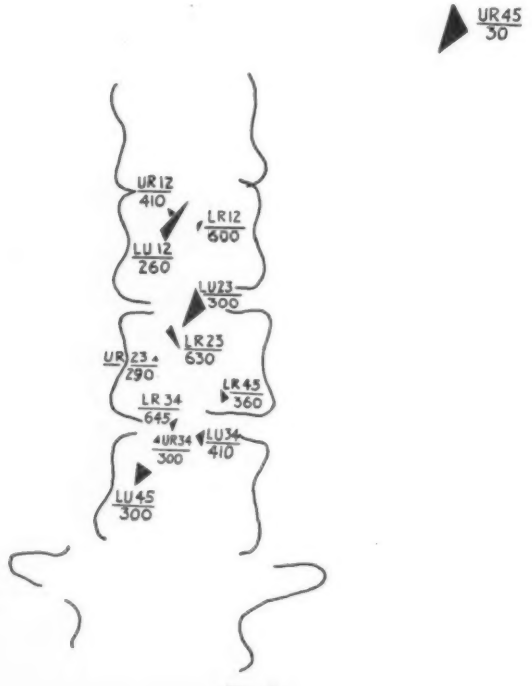

Fig. 7

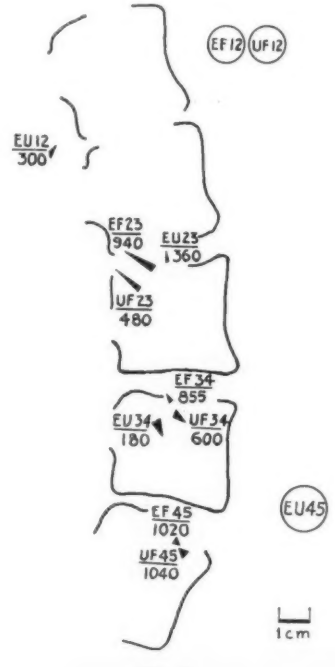

Fig. 8

Fig. 7. R-center summary sheet, subject number 21, lumbar spine, anteroposterior view. Fig. 8. R-center summary sheet, subject number 21, lumbar spine, lateral view.

bral outline on the x-ray plate is too vague to permit matching, or the x-ray image of L1 or L5 may be missing completely; in such cases the absence of data concerning a pair of vertebrae is noted in the margin of the summary sheet by writing the displacement symbol inside a square, as distinguished from the circle mentioned immediately above.) All displacements for all the vertebrae in the spinal area being studied are thereby accounted for on the R-center summary sheets, either by an actual location (and angle) for the R-center, or by a circle or square signifying the reason for the absence of the R-center determination.

The R-center method is applicable to cinefluorographs as well as to sets of serial x-rays. The eventual analysis of cinefluorography by the R-center method has most interesting potentialities because it should thereby be possible to determine the centrode (locus of the instantaneous centers of rotation) of each vertebra; this would provide a complete kinematic description of the motion.

The difficulties of analyzing cinefluorographs by the R-center method are twofold: first, the vertebral outlines in cinefluorography are not as well defined as in serial x-ray photography; second, the accuracy with which an R-center can be located is considerably less for two successive frames of a cinefluorograph film than for successive plates in serial x-rays, because the accuracy decreases with decreasing values of the R-angle. However, neither difficulty is fundamental or insurmountable; it can be expected that these techniques will be refined by further research and development work so that the R-center method can be applied to cinefluorography successfully.

Serial x-rays are entirely adequate at the present stage of the R-center research and development, when norms of R-center locations and patterns have yet to be established and when correlation between R-center findings and clinical findings have yet to be demonstrated. Indeed, in most of the subjects studied to date (including the four subjects of Figures 5 through 12), it suffices for present research purposes to determine the R-centers only for the L, U, R, E, U, and F positions, without using the mid-positions ML, MR, ME, and MF. Nevertheless x-rays have been taken at all these positions, including the mid-positions, for almost all subjects to date, so that the mid-position R-centers for these same subjects can be studied at any later date when such study becomes significant. Obviously a full set of R-centers including these mid-positions approximates a complete kinematic description of motion such as may be expected from cinefluorography.

The R-center method is applicable to the cervical and thoracic spine as well as to the lumbar spine. The experimental work on the R-center method in this laboratory to date has been done principally in the lumbar area, and secondarily in the cervical area. Reproducible results are obtained in the lumbar area with both anteroposterior and lateral views, and in the cervical area with lateral views. Anteroposterior views in the cervical area are considerably more difficult to match, and the reproducibility has not yet been determined.

Although the number of cases studied by the R-center method to date (30 subjects in the lumbar area) is not enough to justify firm conclusions concerning the "normal" location and "normal pattern" of the R-centers, it is possible to report the following general observations and tentative findings:

1. The three R-centers of each lumbar vertebra in the anteroposterior view (the LU, UR, and LR R-centers) tend to lie near each other, approximately within

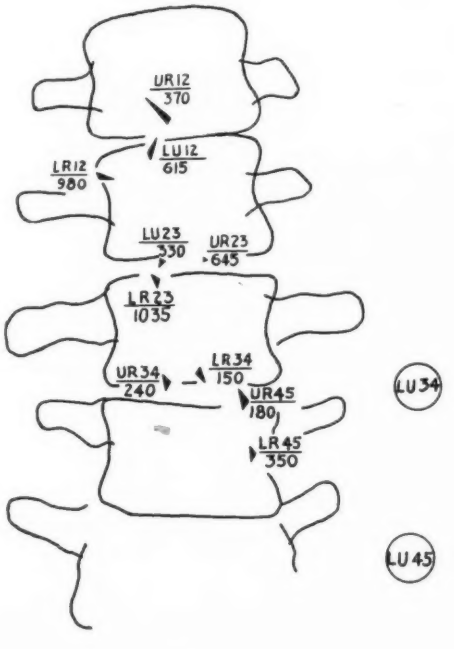

Fig. 9

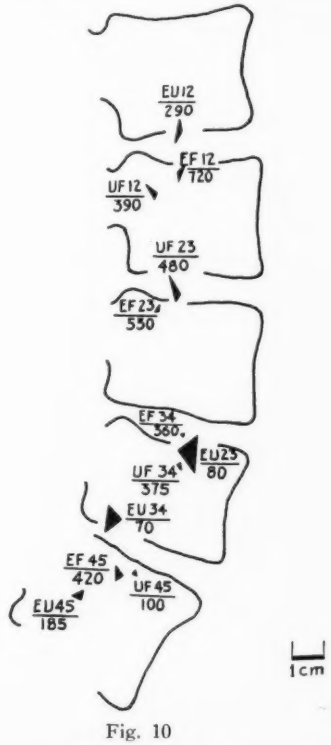

Fig. 10

Fig. 9. R-center summary sheet, subject number 25, lumbar spine, anteroposterior view. Fig. 10. R-center summary sheet, subject number 25, lumbar spine, lateral view.

a circle of 1 or 2 cm. radius. Likewise the three R-centers of each lumbar vertebra in the lateral view (the EU, UF, and EF R-centers) tend to lie near each other approximately within a circle of 1 or 2 cm. radius.

2. The R-centers of any given lumbar vertebra (with respect to its adjacent inferior vertebra) tend to lie either in the intervening intervertebral disk or in the superior part of the inferior vertebral body, and near a median vertical line of the vertebral body. This applies to both lateral and anteroposterior views. One of the exceptions to this rule seems to be the 4-5 R-centers in anteroposterior view; these R-centers seem to lie in the body of L4.

3. There is some slight indication that, for each lumbar vertebra in anteroposterior view, the LU, UR, and LR R-centers tend to lie roughly in a horizontal line in the sequence LU-LR-UR, from left to right; however, this is a highly tentative observation.

Some of the mechanical significance of the foregoing observations (and indeed some of the mechanical significance of all R-center determinations) is explained by the following considerations: The motion of a given vertebra in a given view is a simple rotation about a single point to the extent that the three R-centers coincide; the separation of the R-centers is a measure of the departure of the motion from that of pure rotation about one point—it is a measure of the amount of translation that accompanies the rotation; the direction of the translation is given by the direction of travel of the instantaneous center of rotation, and this direction is indicated by the apparent motion of the R-center as the subject bends laterally or in extension and flexion.

The finding that the lumbar R-centers tend to lie in or near the intervertebral disk (the second of the three observations enumerated above) is in itself a significant result which provides data for further study and analysis of the mechanics and physics of the lumbar vertebrae and their intervertebral disks.

Figures 5 through 12 are R-center summary sheets for four different subjects, lumbar spine, anteroposterior, and lateral views. The x-ray plates for these subjects were only of moderately good quality; sharper images would have given more accurate R-center determinations.

Subject number 22, Figures 5 and 6, illustrates the three general observations and tentative findings enumerated above; most of the R-centers of this subject appear to be "normal" according to these highly tentative criteria. The most notable departure from this "normality" might be the fact that the EU34 R-center in the lateral view is considerably outside of, and anterior to, the vertebral bodies, but this could be explained by the fact that the somewhat small R-angle of 140 degrees handicaps the accuracy of determining this R-center in this case. (The quotation marks are used to emphasize that our present criteria for a "normal" R-center pattern are extremely provisional and tentative.)

Subject number 21, Figures 7 and 8, is interesting because the UR45 R-center, in the anteroposterior view of Figure 7, lies higher than the vertebral body of L1 and approximately 6 cm. to the right of L1. The unusual location of this R-center, and its small R-angle, namely 30 degrees, made the accuracy of this determination suspect, and it was therefore repeated several times independently; the results confirm the general location of this UR45 R-center as shown in Figure 7. It will be noticed that this subject has three ankylosed R-centers in the lateral view, EF12, UF12, and EU45. The ankylosed EU45 motion may be mechanically related to the unusual location of the UR45 R-center in this subject, because the same two vertebrae, L4 and L5, are concerned. In this connection it will be noticed also that the LR45 R-center (anteroposterior view,

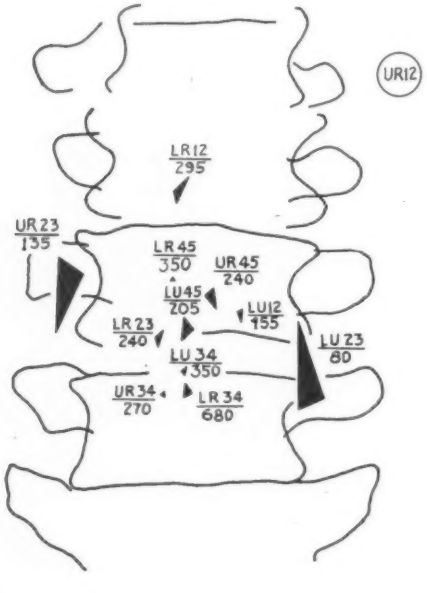

Fig. 11

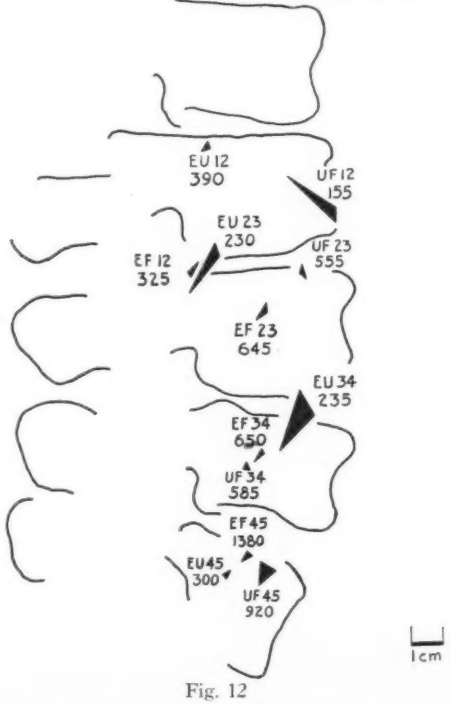

Fig. 12

Fig. 11. R-center summary sheet, subject number 26, lumbar spine, anteroposterior view. Fig. 12. R-center summary sheet, subject number 26, lumbar spine, lateral view.

Figure 7) lies within the body of L3, instead of in the body of L4, as might be expected in a "normal" subject.

In subject 25, Figures 9 and 10, the L3, L4, and L5 vertebrae are ankylosed in lateral bending from the extreme left lateral position to upright; this is shown by the zero angles for LU34 and LU45 in Figure 9. The lateral view of this subject, Figure 10, shows "abnormally" low positions for the EU23 and EU34 R-centers, particularly the EU23 R-center which lies in the body of L4, considerably distant from its companion R-centers UF23 and EF23.

Subject 26, Figures 11 and 12, is interesting because the R-centers in anteroposterior view (Fig. 11) are almost all bunched together in L3 and in the superior part of L4. In addition the UR12 R-angle is zero. The R-centers in lateral view, Figure 12, appear "normal" except for the fact that the 1-2 R-centers are a little low.

The R-center research work to date has used lumbar serial x-ray photographs of only thirty subjects, and cervical serial x-rays of a still smaller number of additional subjects. This number of subjects has sufficed to develop the method itself; but this limited number does not suffice to draw conclusions as to the clinical or medical significance of the locations of the R-centers. Clinical data must now be taken on a much larger number of subjects to determine the normal location and normal pattern of the R-centers and to determine if there is any correlation between clinical findings and the locations or patterns of the R-centers. If such correlation can be demonstrated, the R-center method will be a valuable new tool for clinical diagnosis. If such correlation does not exist, the R-center method nevertheless remains entirely valid as an objective, reproducible, quantitative method for determining and analyzing the kinematics (paths of motion) of the vertebrae. A lack of correlation between clinical findings and R-center findings would therefore indicate a lack of correlation between clinical findings and the actual kinematics of vertebrae. Future research should be done to resolve this obviously important question.

Acknowledgments

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Coincidence of Tumors and Certain Etiologic Factors

Part I. Age and Nutrition

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Neoplastic diseases now are the second and most important cause of death, being surpassed only by the large group of cardiovascular-renal diseases. Although benign tumors sometimes are fatal and often are contributing causes, malignant tumors are much more frequently the cause of death. The death rate from cancer is rising rapidly, but this does not mean that the actual mortality is increasing. As deaths in young people decrease, diseases which appear in middle or old age increase. If it were possible to eliminate all other diseases and accidents, everyone would die of cancer or old age.

A few well-known facts may be recalled. Tumors occur among all multicellular animals and plants. All tumors have one quality in common, an inadequacy of growth control. Not only are the cells of the tumor itself improperly related to one another, but the relation of the tumor to the normal tissues of the host may be far different from the relation of normal tissues to one another. Another trait of tumors, more marked in malignant than in benign growths, is aberrant karyokinesis. The rapid growth of a malignant tumor is largely due to rapid and uncontrolled cell division. Very often karyokinesis begins in daughter cells before reorganization is completed. When only one daughter cell does this, the original cell appears to be engaging in three-way division. When many nuclei divide without undergoing cellular reorganization, the appearance is either that of a giant multinucleate cell or of a syncytium. These two factors, uncontrolled growth and erratic karyokinesis, are present in all malignant and in many benign tumors, thus unifying a disease which otherwise presents protean manifestations of structure, history, behavior, and apparent causes.

From earliest history tumors and deformities have been of great interest. Many theories of their cause and many therapies have been advanced during the past ages. Some of these have been fantastic, and present-day theories may be considered so in the future.

There are now three distinct fields of study. First, each tumor is studied as it appears in any one patient, and some unusual condition is searched for in that person, his heredity, or his environment which might conceivably cause abnormal growth. Such findings are collected, evaluated, and classified.

Cutler and Haenzel[1,2] compared the incidence, prevalence, and mortality rates of cancer in large cities for the years 1937 to 1947. From projected figures,

more than a million cancer cases are anticipated in 1975. These projected figures may be considerably modified by future discoveries. At the present time cancer causes the death of 140.5 people of every 100,000 population in the United States each year.[2]

Second, agents suggested by clinical studies and other observations are used in experiments on animals. Many carcinogenic substances have been determined in this way, and an enormous mass of knowledge is being built up which has yet to be subjected to critical study. Experiments must be repeated on various animals and under varying conditions and improved experimental methods. Carcinogens used in experiments rarely are identical with those which seem to produce spontaneous cancers. For example, soot and tar cause certain spontaneous human cancers, but simple constituents of these complex substances are used in experiments; more exact knowledge is gained thereby, and certain sources of error are prevented.

The third field of study is a search for efficient curative methods. With no adequate information as to the cause, preventive methods are useless. Agents which remove or destroy malignant cells without injury to normal tissues are the chief objects of attention at this time.

Basically, the search for the cause of cancer, benign tumors, and deformity is of first importance and presents the greatest difficulties. Very few studies of benign tumors or of deformities have been made. Reports of recent cancer investigations have been collected and published by Willis,[3] by Homberger and Fishman,[4] and by Greenstein and Haddow.[5] Osteopathic discussions are of interest in this connection: Levitt studied the degenerative diseases in the light of biochemical relations and he included cancer with these.[6,7,8]

Available osteopathic literature provides interesting discussions. Case reports in osteopathic publications and the records in our files give interesting side lights on the changes in surgical and radiologic methods of treating tumors, especially malignant ones, and theories as to the prevention of deformities, benign tumors, and cancers. Flack[9] emphasized the importance of the investigation of the rectum and sigmoid in search of cancer in all cases of hemorrhoids or of functional disorders of the lower colon, sigmoid, or rectum. Tropp[10] studied twenty-five malignant and 111 benign melanomas treated by surgery plus x-ray or radium. Kraus[11] discussed renal tumors and described eight cases. Reed[12] emphasized the importance of pulmonary roentgenology and the early recognition of malignant pulmonary neoplasms. Davis[13] described tumors producing pressure on the spinal cord.

No adequate simplification of the causes of cancer is possible because of the very great variety of spontaneous tumors and the very long list of experimental carcinogens. However, one factor, previously mentioned, is universally present in malignant conditions: Cell division is extremely rapid and almost uncontrolled. Study of this factor in cancer growth is crippled by complete ignorance of the factors which initiate cell division in normal tissue.

A study of the coincidence of neoplasms and their suspected causes as found in the general practice of osteopathic physicians may offer useful information. This report was prepared in the hope that some new aspect of tumor study might become apparent and also that case reports of tumors might become increasingly more complete.

There is evidence that at least two etiologic factors are required for cancer development: Receptive host cells and a specific carcinogen. Heston[14] considers three factors necessary for the development of breast cancer in mice: The milk factor, an inherited factor, and cells which are receptive in the host but are not hereditary. Perhaps later studies may show complexities as great in other cancers or in other animal or human groups.

NOMENCLATURE

Certain terms sometimes are used by different authors in different ways. The following terms are defined as they are used in this report:

A tumor is a mass of tissue not present in its site in a normal person.

A cancer is a malignant tumor; it may disintegrate or may become infected so that little or no massed tissue is palpable or visible; there may be only an ulcer.

An adenoma is a benign tumor whose structure resembles a gland, usually a certain gland which may be present at some site in the normal body. This tumor, or a part of it, may seem to become carcinomatous at any time.

A carcinoma is a tumor whose structure resembles a gland which may or may not be normal at the site but which presents the malignant traits of rapid growth, irregular and abundant karyokinesis, invasion of adjacent tissue, and often metastasis.

A fibroma is a tumor whose structure resembles adult connective tissue. Although it is benign in structure, grows slowly, and rarely shows more than a very few karyokinetic figures and these are usually of normal appearance, though it has scanty vascularization and the vessels usually show normal structure, it may cause very serious symptoms due to its pressure and weight, and so may cause death. A lipoma is such a structure containing abundant fatty tissue. Osteoma, chondroma, and osteochondroma are like fibroma except that the tumor may be composed partly of cartilage, and this may undergo ossification. More commonly the tumor shows deposits of calcium in which true ossification may appear to be present in irregular areas. Such tumors within the brain cavity, the orbit, or the spinal canal may cause extremely severe symptoms or death.

Tumors made up, in part, of smooth muscle cells (leiomyoma) may be indistinguishable from fibromas. In this report such a tumor is called a fibroid, and this word is commonly used in a large majority of the records which come to us.

A sarcoma is a malignant tumor resembling immature or embryonic connective tissue. Small areas resembling sarcoma often are found within fibroids, rarely within other fibromas. Sarcoma may be primary or may arise within a fibroma, perhaps from a sarcomatous area such as has been mentioned. Sarcoma, which varies greatly in malignancy, may grow very rapidly or slowly; it may be abundantly supplied with thin, tortuous, atypical blood vessels, or the vessels may seem almost normal in structure and function. It never resembles a gland, but a carcinoma may undergo anaplastic changes and finally resemble a sarcoma.

An epithelioma is malignant in varying degrees. Its cells resemble those from some layer of the skin or mucous membrane, from which it usually arises. The same term has been applied to tumors arising from true endothelial cells. Certain joint cavities and other

spaces are lined with cells grossly resembling endothelium but derived from connective tissue or cartilage. Such tumors are sarcomas, and they resemble very closely the sarcomas arising in other tissues.

A teratoma or mixed tumor includes two or several cell groups which have no logical place in the site where they are found. They may be either malignant or benign, or certain of their tissues may be malignant while other parts are benign. A disturbance of some early developmental process is indicated by their structure. When such a tumor is partly malignant, the great size of that portion usually masks the benign elements of the growth, and the teratoid origin remains unsuspected.

Mucoid and serous polyps are classed with tumors though they often appear to be the result of inflammation and accumulation of fluid within sagging and atonic folds of membrane. Such polyp-like structures have been found in the nasal mucosa of experimental animals in which disturbed innervation and circulation are associated with congested, edematous, atonic membranes. Mucous and serous polyps are reported rarely in our records, though they do occur frequently. Other terms used in this report do not differ significantly from general usage.

MATERIAL EMPLOYED

Case records have been collected from fifty-seven individual osteopathic physicians and from six hospitals, five clinics, and three sanatoriums, each with a staff of osteopathic physicians. These records, with no actual name or other personal identification, have been coded and copied on sorting cards. This collection, which numbers approximately 25,000 cards, increases daily and should continue to do so indefinitely.

From these cards all those indicating the presence of a tumor were removed for scrutiny. Unless otherwise noted, diagnosis was based on the microscopic examination of the tumor. Not every report included information on every item, hence the totals vary in different discussions.

Divisions were made according to sex, age, type of tumor, site of tumor, spinal condition, nutrition, weight and height, multiplicity, and concomitant diseases or injuries.

SEX INCIDENCE OF TUMORS

So far as tumor growth per se is concerned, the sex of the host seems to be unimportant. The presence of different organs with different functions, and differences in occupation, habits of living, and other extraneous factors cause certain numerical differences and necessitate keeping the records of males and females separate.

Taking all records of adults, including all diseases and all examinations of normal persons, but excluding cases of pregnancy and labor, there is one male to two females. Among children, records of males and females are about equal. Benign tumors are found to predominate in females about seven to one, the reason being the large number of uterine fibroids and pelvic polyps recorded. Malignant tumors are about five times more frequent in females. This preponderance results from the great number of cancers of the female breast and pelvic tissues.

Table I shows the number of males and females with benign, malignant, or multiple primary tumors (both benign and malignant tumors occur in the same person).

TABLE I—TOTAL PRIMARY TUMORS

Sex	Benign	Malignant	Multiple (Benign and Malignant)	Total
Males	36	116	4	156
Females	249	560	57	866
Total	285	676	61	1022

RELATIONSHIP OF AGE AND CANCER

On all the cards in this study, age is recorded from the nearest birthday. Before 6 months, the age is recorded as newborn. From 6 up to 18 months, age is recorded as 1 year; from 18 up to 30 months, 2 years, and so on. When the nearest birthday is not known, the age reported is that of the last birthday. Error due to this use of the previous birthday is negligible under these circumstances.

An estimate was needed of the population from which the records under study were derived and of the relative number of persons in each age group in this population. The total of the records was not suitable for this computation since they include relatively few normal persons and relatively few children. It is assumed that the incidence of cancer in persons who consult osteopathic physicians does not differ appreciably from the incidence of cancer among the general population; however, the cancer records being studied do not include any nonwhite patients. It is necessary to use figures indicating prevalence, rather than those giving mortality or incidence, because the records include apparent recoveries. Reports of the prevalence of cancer in the total white population of several cities—Detroit,[15] Chicago,[16] Pittsburgh,[17] Dallas,[18] and Birmingham[19]—are available.

Using the means of these records as criteria, the population from which the records being studied are drawn can be estimated as approximately 148,000, including all ages. This population was arranged in age groups. Since about nine tenths of these records came from the vicinity of Los Angeles and since a recent census of that city was available, the source population was divided among age groups in the proportions shown in that census; Table II shows the population of Los Angeles by age groups.

TABLE II— POPULATION BY AGE GROUPS, LOS ANGELES, SEPT. 26, 1953

Years of Age	Number
Under 5	197,126
5- 9	168,862
10-14	125,266
15-19	102,044
20-24	118,599
25-29	169,746
30-34	183,756
35-39	180,262
40-44	165,929
45-54	285,990
55-64	206,641
65-74	138,529
75 and over	61,913
*Total, All Ages	2,104,663

*Special Census of the City of Los Angeles, U. S. Bureau of the Census.

These figures were adjusted to the age groups used in the tables in this study, and the source population was divided into age groups in the same propor-

TABLE III—SOURCE POPULATION BY AGES

Under 20 years	20-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70 and over	Total
41,588	20,276	25,900	21,756	17,168	12,136	9,176	148,000

tion. Table III shows the estimated number of persons in each age group of the source population of the cancer records.

CANCER TYPES BY AGES

Table IV shows the distribution within each age group and the estimated number per 100,000 of the source population for each age group and for each type of malignancy. Records which do not include the age of the patient were placed in an eighth column, "Not Reported." The number in this column is negligible. It is included here in order that the number per 100,000 in each age group may be approximately correct.

While the persons per 100,000 are few and the estimations show a higher percentage of unavoidable error than is desirable, certain trends which are convenient for comparison are indicated.

The distribution of types of malignancy among the different decades was computed. All records in which the type was reported were divided into five classes: epithelioma, carcinoma, sarcoma (including malignant melanoma), malignant conditions of the blood, spleen, and lymph nodes, and miscellaneous. Multiple tumors are classed according to the malignant tumor first recognized.

Sarcoma and leukemia, both mesodermal cancers, are relatively more frequent in childhood and in old age. Before the age of 20, these alone appear in our records, though both epitheliomas and carcinomas are reported during childhood in other reports. During the twenties, 5.5 per cent of all cancers were of mesodermal origin. From age 30 to age 60 mesodermal cancers made up 8.3 per cent of all cancers, while at age 70 and over, 15 per cent of all cancers were of mesodermal origin.

Of cancers of epidermal origin, epithelioma has a predilection for younger hosts and those past the age of 70. During the twenties, 32 per cent of all epidermal cancers are epitheliomas; from the age of 30 to 50 the incidence of epithelioma decreases gradually until only 13 per cent of cancer of epidermal origin during the sixties are epitheliomas, but after the age of 70, 22 per cent of epidermal cancers are epitheliomas.

While the number of cases in this study is small, the above findings agree substantially with other records. These relations suggest that there may be some significance to theories of the embryonic origin of cancers, at least of benign tumors, though recently there has been a general trend away from considerations related to the germ layers.

Table V shows the age distribution of cancer according to the system involved. Cards showing records of malignant tumors were divided into groups as follows: Skin, digestive tract, male genitourinary system, female genitourinary system, female breast, blood and lymphoid tissue, and miscellaneous which includes cancers found only in small numbers in the records.

TABLE IV—AGE DISTRIBUTION OF TYPES OF TUMORS

Type	Below 20 Years	20-29	30-39	40-49	50-59	60-69	70 and over	Not Reported	Total	Per 100,000
Epithelioma										
M	0	1	2	8	3	10	4	9	37	
F	0	6	31	25	20	2	3	7	94	
Total	0	7	33	33	23	12	7	16	131	88
Carcinoma										
M	0	0	3	10	13	15	9	4	54	
F	0	15	76	171	111	27	16	44	460	
Total	0	15	79	181	124	42	25	48	514	347
Sarcoma										
M	2	1	0	0	2	0	0	1	6	
F	2	1	3	9	11	2	2	1	31	
Total	4	2	3	9	13	2	2	2	37	25
Blood, Spleen, Lymph										
M	2	3	2	3	3	2	2	3	20	
F	2	2	6	6	0	1	2	1	20	
Total	4	5	8	9	3	3	4	4	40	27
Miscellaneous										
M	0	0	1	4	15	0	0	1	21	
F	0	5	3	0	1	8	2	3	22	
Total	0	5	4	4	16	8	2	4	43	29
Total										
M	4	5	8	24	36	27	15	18	137	
F	4	29	116	211	144	40	25	56	625	
Total	8	34	124	235	180	67	40	74	765	517
Source Population	41,588	20,276	25,900	21,756	17,168	12,136	9,176		148,000	
Number per 100,000 of Source Population	19	168	490	1,080	1,049	553	435	50	517	

TABLE V—PREVALENCE OF TUMORS IN AGE GROUPS BY SYSTEMS

	Below 20 years	20-29	30-39	40-49	50-59	60-69	70 and over	Age Not Reported	Total	Per 100,000
Skin	2	0	8	14	9	5	7	5	50	338
Digestive	0	3	9	21	20	20	14	5	92	622
Male Genitourinary	0	3	0	8	3	7	2	2	25	169
Female Genitourinary	0	20	91	130	65	29	6	30	371	2,506
Female Breast	0	5	17	45	30	15	7	16	135	912
Blood and Lymphoid	1	1	1	2	7	2	1	3	18	122
Miscellaneous—Including Respiratory, Nervous and Skeletal System and Male Breast	0	1	1	4	5	2	2	2	17	115
Total Malignant Cancer in Each Age Group	3	33	127	224	139	80	39	63	708	4,784
Source Population	41,588	20,276	25,900	21,756	17,168	12,136	9,176		148,000	4,784
No. per 100,000 of Source Population	7	16	45	102	751	658	425	42		

A preliminary survey disclosed no recognizable difference according to sex, and except for cancer of the reproductive systems, there is no differentiation in the table. The totals are not the same for Tables IV and V for reasons previously explained. Table V shows also the number per 100,000 source population of each system involved at all ages, and the number per 100,000 for all ages for each system involved.

NUTRITION AND TUMORS

Overeating was an early suggested cause of tumors. Since the word "tumor" first meant any local increase in size and since the body increases in size when people habitually overeat, since tumors usually occur in middle-aged or elderly persons who often are overweight, and since they often occur in persons otherwise normal, the inference is logical enough. In later centuries accumulation of blood or of tissue fluid was supposed to cause tumor. At the time of Hippocrates almost any sore which remained unhealed was called cancer. Such a sore often began in obese or edematous persons, and since the sores often were preceded by or associated with swelling and inflammation of the adjacent tissues, it was logical to assume an etiologic relationship between swelling, congestion, and cancer. The idea that tumors are caused by general or localized accumulations of nutritive substances in blood or lymph, or an excess of anabolism over catabolism, or the presence of substances imperfectly oxidized and thereby toxic has recurred repeatedly in discussions of tumors throughout the centuries.

Recent experimental studies indicate that the initiation of cancer may be affected by nutrition, though many reports are inconclusive. Diets which are adequate in all respects except that carbohydrates are restricted have been found to delay or restrict the efficacy of various experimental carcinogens. Transplants of certain cancers grow slowly or not at all in certain animals on this diet. An excess of carbohydrates seems to facilitate the action of carcinogens. An excess of fats, proteins, or vitamins seems to be less constant and less effective in promoting the initiation or the transplantation of cancers. Many of these tests are inconclusive or the findings mutually antagonistic. Greenstein and Haddow[5] have reviewed many of these reports.

Changing the diet has not been found to affect the persistence or the rapidity of growth in a person or an animal after the cancer has developed or after the transplant has begun to grow.[20]

In human beings the relation between diet and tumor, especially cancer, is puzzling. Many persons developing cancer have been on a diet in which carbohydrates were adequate or excessive, though there are many exceptions to this statement. Very inadequate diets increase cancer incidence in certain animals subjected to certain carcinogens. Cancer does sometimes occur in thin, sickly persons.[20-22] Cancer of the liver following cirrhosis causes death in about 80 per cent of Bantu males employed in gold mines near Johannesburg, South Africa. These Bantus live chiefly on a diet of sour milk and corn meal. White persons and Negroes living on an adequate diet very rarely have either cirrhosis or cancer of the liver.[23-25]

The Metropolitan Life Insurance Company issued substandard insurance to 25,998 men and 24,901 women because of overweight.[26] All were first-class risks except for obesity. Included were all ages between 20 and 64. Insurance was written during the years 1925 to 1934 and observation terminated in 1950. During this time 3,713 of the men and 2,687 of the women died.

The death rates of standard risks in each sex equal 100 per cent. Deaths from cancer of the liver and gallbladder showed a marked increase in obese men (168 per cent of deaths expected among persons of normal weight). It is significant that deaths from cirrhosis of the liver (249 per cent of expected rate) and from biliary calculi (206 per cent of expected rate) showed even greater increase among obese men. Among women, the death rate due to cancer of the breast was lower among the obese (69 per cent of the expected deaths among women of normal weight). Cancer of the liver and gallbladder showed an increase among obese women (111 per cent of the expected deaths), while cirrhosis of the liver caused 147 per cent of the expected deaths and biliary calculi 284 per cent of expected deaths of women issued substandard insurance.

These figures do not indicate any significant increase in the cancer death rates among either men or women, except for those of cancer of the liver and gallbladder. This increase is of serious proportions among the obese.

These figures, however, are subject to misinterpretation. Estimates are based upon deaths among all ages, 20 to 64 years. Increasing death rates from cardiovascular-renal diseases (149 per cent of the expected death rate for men of normal weight and 177 per cent

of that for normal women) and diabetes (383 per cent of the expected rate for men and 372 per cent for women of normal weight) together with a less marked increase in various other diseases of early and middle life diminish the incidence of cancer in the total population.[27] It is evident that any person who dies of cardiovascular disease or diabetes during his twenties or thirties cannot die from cancer in his forties or fifties. Since the highest excess of deaths in the obese over persons of normal weight occurs in the twenties and the next highest during the thirties, the relative death rate from cancer is obviously minimized considerably. No report not subject to this relative error was found.

Not all the records in this study include the height and weight of the patient. Previous health is mentioned occasionally, but data on three groups merit comparisons: Uterine fibroids, uterine cancers, and breast cancers.

Table VI shows the relationship between age and weight in patients with uterine fibroids, early and late uterine cancer, and early and late breast cancer, together with the average weight and height of fifty normal, adult, nonpregnant women with normal spines, routinely examined. All reports are from the same sources.

TABLE VI—AVERAGE HEIGHT AND WEIGHT, WOMEN WITH FIBROIDS AND CANCER

Diagnosis	Cases	Average Weight in Pounds	Average Height in Inches	History Good	History Poor
Uterine Fibroids	34	140	64	35	8
Early Uterine Cancer	9	162	66.4		
Late Uterine Cancer	5	118	66		
Early Breast Cancer	29	149.5	64	29	20
Late Breast Cancer	19	116	65		
Normal Adult Nonpregnant Women with Normal Spines	50	132	64	50	

Thirty-four records of uterine fibroids gave both weight and age of the patients. In all these cases the tumors were large enough to cause symptoms; the duration of the growth cannot be determined. In 3 cases obesity was present; the most marked was reported in a woman barely 5 feet tall who weighed 200 pounds. Emaciation was not present in any patient in this group, though in other records the patient was said to be "extremely thin." The average weight of 34 patients with uterine fibroids was 140 pounds; the average height was 64 inches. These figures do not vary significantly from the average height-weight ratios of noncancerous, nonpregnant female patients in this age group.

Both weight and height were given in 14 records of uterine cancer. In 9 cases the cancer was recognizable but had not metastasized or invaded surrounding tissue. In these cases no severe emaciation was reported. One case of obesity was noted, that of a woman 66 inches tall weighing 180 pounds. In 8 cases weights were considerably above the usual weights of average women patients. The average weight of 9 patients with early uterine cancer was 162 pounds; the average height, 66.4 inches.

In 5 cases of uterine cancer with marked invasion of neighboring tissues, with or without metastases, both weight and height were given. In this group, neither obesity or even definite overweight was reported. The average weight in 5 cases of advanced cancer of the uterus was 118 pounds; the average height was 66 inches.

These cases are too few to justify definite generalizations. In this series, however, the average woman with early uterine cancer is about 2 inches taller and approximately 20 pounds heavier than the average woman with uterine fibroids, and the woman with uterine fibroids is approximately the same height and within 10 pounds in weight of the average noncancerous, nonpregnant female patient in the same age group.

In 43 cases of cancer of the uterus the previous health of the patient was reported. Slight temporary disorders were disregarded. In one case, health was reported as excellent until an abortion 3 years before the first reported examination; from that time the patient was never really well, and symptoms referable to uterine cancer seemed to be a continuation of her general poor health. In 2 cases previous poor health was limited to menstrual disorders. In 5 cases a history of constant poor health was reported, but no diagnosis was mentioned. This total of 8 cases is 18.5 per cent of the total number of cases of uterine cancer in which previous health was mentioned. In 35 cases (81.5 per cent), previous health was said to be good or excellent.

Cancer of the breast merits consideration. In 48 reports both height and weight were mentioned. In 29 of these the tumor was recognizable by palpation, but adjacent tissues were not definitely invaded, and no metastasis was recognizable. The average weight of these 29 women with early breast cancer was 149.5 pounds and the average height 64 inches.

In 19 records, breast cancer was first noted after adjacent tissue was definitely invaded and usually after metastases were easily recognizable. In no case was obesity present. One woman of 98 pounds was 67 inches tall. Emaciation was not severe in any other case, though all the patients were below ideal weight. The average weight of 19 women with advanced breast cancer was 116 pounds; their average height, 65 inches.

In 49 records of breast cancer the previous health of the patient was mentioned. These records are not all of patients whose weight and height were reported. In 29 (59 per cent) of these cases previous health was said to be good or excellent. A record of poor health before the development of breast cancer was mentioned in 20 cases (41 per cent).

We have very few records giving the rapidity or abundance of metastases. In available literature we found no report showing relative metastasis nor rapidity of recurrence in persons on special diets or under any nutritive condition. One surgeon told me, many years ago, that after cancer surgery he prescribed a diet high in vegetables and fruits, low in meats and very low in carbohydrates and that recurrences were less frequent and much longer delayed when patients followed this diet. This view was very unpopular at that time, and no adequate record is now available.

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Peripheral Arterial Embolism

Embolic Catastrophes Involving the Peripheral Arterial System*

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Nothing is more vital to the life of the parts of the human body than the blood supply. A threat to that supply in the form of sudden arterial occlusion constitutes a real emergency requiring early diagnosis and proper treatment in order to prevent irreversible tissue changes or gangrene. In former years, the criterion for the diagnosis of acute arterial occlusion was the presence of gangrene. Now it is realized that gangrene is a late manifestation of the disease and that when such irreparable damage to the body tissues occurs, no therapy known will restore function. Adequate and effective treatment of the patient during the incipient stages offers the greatest hope for a favorable prognosis.[1]

ETIOLOGY

Any foreign or abnormal particle circulating in the blood may be an embolus and result in embolism when it lodges in a vessel too small to permit its further passage. An embolism is a sudden, shocking, usually complete closing of a previously patent major artery (or vein) by the lodgment of a clot or foreign material (embolus) arising in another part of the circulatory system.[2]

The peak incidence of peripheral arterial emboli occurs in the fifth and sixth decades. In one series of cases the patients ranged from 12 to 85 years of age with 74 per cent falling between 41 and 70 years.[3]

There seems to be a slight preponderance of female over male patients, the sex incidence being approximately 55 per cent and 45 per cent respectively. This may be partially explained by the fact that in females there is also a slightly greater frequency of rheumatic fever and subsequent valvular lesions, namely, mitral stenosis, an etiologic factor in peripheral arterial emboli.

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Etiologic Classification of Embolic Arterial Occlusion.[4]—

Cardiac
- Auricular fibrillation from any cause
- Myocardial infarction with mural thrombosis
- Mitral and aortic valvulitis
  - Bacterial: acute, subacute
- Failing heart from any cause

Arterial
- Mural thrombosis
  - Aneurysm
  - Arteriosclerosis
  - Trauma
  - Inflammation

Venous
- Through patent foramen ovale (paradoxical embolus)
- Pulmonary vein thrombosis

Sources of Peripheral Arterial Emboli.—

Clinical diagnosis of peripheral arterial embolism rests essentially upon the presence or absence of a source of thrombosis.

Cardiac: The role of auricular fibrillation in promoting auricular thrombosis is well known, but it also is the exciting cause in nearly all instances of emboli arising from the heart. A change in rhythm to auricular fibrillation occurs in 25 per cent of patients with chronic rheumatic heart disease. Mural thrombi are found in one or more chambers of the heart in 13 per cent to 56 per cent of autopsies on patients with chronic rheumatic heart disease. Age seems to increase this incidence.[2] From the Bailey Thoracic Clinic, it is reported that one of every four patients treated for mitral stenosis by commissurotomy has clots in the auricular appendage.[5]

Mural thrombi associated with myocardial infarction are the second leading cause of peripheral arterial embolism, according to statistics accumulated by Haimovici.[3] In 11 per cent of cases, the myocardial infarction was "silent." The atypical myocardial infarction made difficult or impossible the clinical diagnosis of acute peripheral arterial occlusion due to emboli originating from an apparently nonpathologic heart. The diagnosis was made with subsequent clinical course or on autopsy. According to White[6] the most common cause of mural thrombi in the heart is myocardial infarction, and it almost always involves the left ventricle. Rheumatic heart disease is the second most frequent cause, with thrombosis on the left atrial wall or its appendage, especially in the presence of atrial fibrillation.

It is interesting to note that 25 per cent of those who die of cardiac disease have an embolism at some stage in their heart disease.[2]

Arterial: Among other possible sources of peripheral arterial emboli are thrombi or calcific plaques originating and detaching from arterial aneurysmal areas. Trauma causing local arterial thrombosis may be the source of a later embolism if the thrombus loosens or liquefies, and if this occurs it is usually between the seventh and fourteenth days. Fat and air embolisms are different entities, but may still occur.[2] An inflammatory reaction adjacent to a major vessel may also be responsible for the production of a localized thrombus which may detach following local tissue changes. Arterial sources of possible emboli are apparently more common than suspected, with one authority[3] reporting an incidence of 19.3 per cent.

Venous: Occasionally the embolism may arise from the right side of the heart. This is known as paradoxical embolism and requires the presence of a patent foramen ovale. It was first reported by Cohnheim in 1877.[2] Two cases of pulmonary vein thrombosis have also been reported as the source of peripheral arterial emboli.[3]

Location of Emboli.—

As a potential embolus is displaced, it progresses through the arterial circuit until it lodges at a point of narrowing, that is, at a bifurcation of an artery. The point or level at which it lodges is dependent upon the size of the embolus and the diameter of the lumen of the artery. In the lower extremities, the aortic bifurcation is the first point at which the arterial lumen diminishes rather markedly in size. Thus this point serves to block the passage of an embolus if the embolus is larger than either common iliac artery, which fortunately occurs rather infrequently. This is often referred to as a saddle embolus at this level since it usually obstructs both iliac arteries and assumes the configuration of a saddle. However, this embolus may fragment or slip through, only to lodge at an even lower level, thus further complicating the diagnostic and therapeutic picture.

The respective incidence of the different sites of peripheral emboli as reported by various authorities is quite consistent, with approximately 85 per cent of peripheral emboli occurring in the lower extremities and approximately 15 per cent in the upper extremities.[2,3] Of those occurring in the lower extremities, about 10 per cent are in the aorta, about 10 per cent in the iliac artery, about 50 per cent in the femoral artery, about 13 per cent in the popliteal artery, and about 2 per cent in the tibial artery. Of those in the upper extremities, about 4 per cent are in the axillary artery, about 9 per cent in the brachial artery, and about 1 per cent each in the radial and ulnar arteries.

As evidenced by these figures, most of the emboli are arrested at the junction of the femoral and deep femoral arteries. Only one in seven occurs in the upper extremities. Multiple emboli are not an infrequent occurrence. On occasion, there may be a shower of emboli to both the extremities and viscera. This possibility must be kept in mind, for it has important bearing on the treatment and prognosis of the condition. Visceral emboli, such as cerebral, renal, and mesenteric, occur with much less frequency than peripheral emboli, but their diagnosis is more difficult and their prognosis more uncertain.

PATHOGENESIS AND PATHOLOGY

The sudden blocking of an arterial lumen by an embolus sets up a complex chain of physiopathologic events. The study of these events has considerable importance in understanding both the course of the clinical manifestations and the rationale for treatment of the condition. Four important factors upon which the prognosis depends must be considered as physiopathologic aspects of this condition.[3]

Mechanical Factors.—

The survival of a limb that has had its major blood supply occluded will depend essentially upon establishment of adequate collateral circulation. The degree of development of collateral circulation will depend in turn, at least partially, on two factors, the site and extent of occlusion.

The arterial bifurcations where emboli usually lodge are referred to as dangerous arterial zones, chiefly because of the danger of occlusion of important collateral branches coming off from them. In contrast, branches situated proximally and distally to the occlusion may take over the burden of the circulation if the arteries involved have few or no important collateral branches at the site of occlusion. These zones are referred to as relatively tolerant to acute arterial occlusions.[7]

Again, if the effect of the occlusion remained limited to the size of the embolus, it would be similar to that of a simple arterial ligation. However, the hemodynamics of the circulation following acute arterial occlusion are greatly upset since the chain of events that ensues is very different from that of a simple ligation. The difference seems to be due to the spasm and the thrombosis in the rest of the arterial tree. In a simple ligation, the collateral circulation often takes up the load, while in embolism, shock and the cardiac status make secondary thrombosis more likely.

Vasospasm.—

Sudden and complete occlusion of a major artery of an extremity by an embolus is capable of inducing marked vasospasm both of the distal segment and of the collateral branches. This spasm may involve the entire collateral system of the occluded artery, including arterioles and capillaries, thus considerably increasing the degree of ischemia and the danger of gangrene. This spasm is of reflex origin and is initiated by stimulation of the sensory fibers contained in the arterial wall at the site of the embolus.[3]

Pratt[2] has stated that the spasm created is a protective mechanism to aid in emptying the blood vessels distal to the embolus so that they will not become thrombosed. In such vessels, circulation can most often be re-established. However, with the drop of arterial pressure in the capillary bed, venous thrombosis may follow, owing to the fact that the spasm empties the

vessels but, with relaxation, the venous blood leaks back into the capillary bed. The exact meaning of the term "spasm" is questioned by some authorities since it has not been definitely shown whether it is spasm of the involved artery or collateral vessels or whether it is the temporary persistence of normal neurogenic or myogenic tonus that usually accounts for the several hours' interval that may occur between the time of acute occlusion and the time that the blood flow may return to normal.

Secondary Arterial Thrombosis. — A secondary thrombus may be formed after a short lapse of time because of the clotting of blood proximally and, especially, distally to the original embolus. The extension of the thrombus aggravates the initial mechanical obstruction by involving a larger segment of the main trunk and its collaterals. This secondary thrombosis then proves to be far more dangerous to the vitality of the extremity than the original relatively small embolus. The main factors responsible for the production of the secondary thrombosis seem to be the considerable decrease in arterial pressure below the site of occlusion with the resulting blood stagnation, the increased degree of coagulability of the blood, and, more particularly, marked arterial spasm.

Histopathologic Changes of the Arterial Wall.— Within a short time after the embolus has lodged, structural changes take place in the arterial wall at the site and soon become irreversible. The success of return of normal or adequate circulation often depends upon the intimal damage which has resulted during this interim of vasospasm and possible secondary thrombosis. In addition, inflammatory reactions of the adventitia also take place at the site of the embolus and are more pronounced than those found in the media and intima. The presence of this embolic periarteritis may be responsible for additional noxious vasoconstrictor reflexes and for the propagation of the inflammatory process from the artery to the adjacent venous and lymphatic components.

SYMPTOMS

The symptoms of sudden arterial occlusion vary according to factors such as the site of obstruction and presence or absence of significant collateral circulation. However, the onset of the clinical manifestations usually is very characteristic.

It is generally assumed that the acute episode is ushered in with sudden, excruciating pain followed by numbness, coldness, and tingling of the affected part. In one series of over 300 cases of sudden arterial occlusion, the following data was carefully obtained and recorded.[3] There was a sudden onset in 81.2 per cent, sudden pain in 59.5 per cent, silent occlusion in 5.7 per cent, progressive onset in 11.7 per cent, and sudden numbness and coldness without pain in 21.7 per cent. Thus, on the basis of these data, arterial embolism would be suspected in only about 80 per cent of cases, or 4 cases out of 5, with the onset being progressive instead of sudden in about 10 per cent of the cases or about 1 out of 10 patients.

The initial site of pain seems to be in the region of the lodgment of the embolus and also distally. In some instances, such as migrating embolus, the site of pain may change with the shifting of the embolus. The most common type of migrating embolus is the saddle embolus. Also, rarely, the initial pain may be located in an extravascular region, such as the sciatic nerve and, thus, the posterior aspect of the thigh and leg. Following the acute episode, there also may be tenderness along the course of the involved artery.

There follows the complaint of numbness of the extremity with continued discomfort. As the part is further deprived of blood and nutrition, muscle cramps may occur, particularly if movement is attempted. Paresthesia is then first noticed, and paralysis develops as ischemia continues. This is common with involvement of a major vessel. During the early phase of ischemia, few changes may be noted, but as it continues, the muscles become doughy and finally hard and indurated, denoting muscle infarction. Thus, passive joint movement will be impossible because of the irreparable damage to the muscles, and ambulation will be impossible owing to the weakness and paralysis of muscle groups.

The involved extremity is cooler than normal and generally appears pallid, waxy, and marblelike; later areas of skin are mottled with cyanosis and are sharply contrasted against the waxy, pale background. The blotchiness and cyanosis signify venous engorgement which may eventually become more blue. If adequate circulation is not present, uniform cyanosis and a beginning demarcation are evident. The development of this color means that there is no hope of survival of the extremity or part. There is usually a fading from the black to a mottled blue to a reddish color, and then to a normal pink, which may extend to some degree below the site of occlusion. Mottling in itself is a serious prognostic sign and, along with the blebs and skin breaks which follow venous engorgement, ensures imminent tissue death.

Shock usually is a concomitant factor which may be mild or severe, depending upon the site and extent of the embolus. There may be apprehension, anxiety, generalized pallor, and tachycardia, with sudden unconsciousness, and death may result if shock is sufficient.

TABLE I—LEVEL OF OCCLUSION WITH CORRESPONDING CLINICAL SYMPTOMS

	Aorta	Femoral	Popliteal	Axillary	Brachial
Pain	Both legs and back	Leg and foot	Lower leg and foot	Arm, forearm, and hand	Forearm and hand
Muscle Weakness	Below hips	Foot and toes	Toes and weakened ankles	Elbow, wrist, and fingers	Wrist and fingers
Numbness, Coldness, Discoloration	Below hips	Below knee	Below ankle	Below mid-forearm	Hand
Gradual Temperature Gradient	Skin temperature decreasing gradually and extending distally from point of occlusion				
Extent of Gangrene	Bilateral—feet to hips	Toes to legs	Toes	Fingers or hand	Terminal digits or none

DIAGNOSIS AND INTERPRETATION OF SYMPTOMS

Although the diagnosis of peripheral arterial embolism usually is simple, the incidence of diagnosis parallels roughly the physician's suspicion that it exists. If the extremities are examined for the condition only when severe pain, pallor, and coldness exist, many cases will be overlooked since the symptoms are often minimal and bizarre.

There are three main reasons for the failure to make a correct diagnosis. The first reason may lie in a commonly accepted fallacy that the onset of an embolism is always dramatic and sudden. However, figures given previously indicate that this is not always the case. The second reason derives from the failure to bear constantly in mind the possibility of embolic manifestations in heart disease. This complication should be anticipated in every case of acute coronary thrombosis and chronic rheumatic or arteriosclerotic heart disease, and particularly in those patients with fibrillation. The third reason accounting for some of the difficulties is incorrect differentiation of peripheral arterial embolism from other vascular disorders, as arterial spasm, acute thrombophlebitis, and acute arterial thrombosis.[3]

In some cases the diagnosis of peripheral arterial embolism can be made from the history alone. The usual sequence is that of a patient with rheumatic heart disease with auricular fibrillation who suddenly develops a cold, pulseless extremity, this being pathognomonic. Associated with this sequence is the element of pain in the majority of patients. The initial pain has been attributed to the localized arterial spasm or vasomotor mechanism which always occurs. However, this does not completely explain the fact that nearly 22 per cent of patients experience no significant discomfort. Pain may be ischemic, due to the resultant ischemic neuritis, or it may result from tissue disintegration. Whatever the physiology of the pain-producing mechanism, it is usually severe enough to produce shock and require sedatives for its relief.

The local diagnostic signs of peripheral arterial embolism include the following neurovascular changes: absent pulse (asphygmia), coldness, discoloration, anesthesia, hyperesthesia, delayed capillary filling, collapsed superficial veins, and paralysis of the involved part.

Objectively, arterial pulsations are absent beyond the site of occlusion. However, there may be a transmission of the pulsation a few inches distal to the actual point of obstruction. This is of importance in determining the site of occlusion of the embolus and the site for possible surgical intervention (embolectomy). Again, depending on the site of occlusion (aorta, iliac, subclavian) or even edema, some difficulty may be encountered in determining the presence or absence of pulses by palpation or with the oscillometer. The use of the oscillometer is of value for two reasons, the first being the detection and verification of weak arterial pulsations not easily discernible or palpable, and the second being the measurement and recording of the intensity of the pulsation, which may later be a means of evaluating the method of treatment and prognosis. Also, it must be remembered that the intensity of the pulsation is often increased just proximal to the site of obstruction, and this may also be of importance in localizing the site of the embolus.

The coldness and discoloration (pallor, mottling, et cetera) of the area distally is quite evident and marked until the occlusion is either removed or the adjacent reflex arterial spasm has been alleviated and allows the collateral circulation to attempt to supply the deprived part. The use of the dermalor to measure the skin temperature is not necessary except for recording purposes since the physician's hand can easily detect the change in skin temperature and the level of temperature gradient. However, the dermalor is useful in measuring the increase in skin temperature if treatment proves effective following vasodilating efforts (intra-arterial medication, sympathetic nerve blocks, et cetera). A distinct line of color and temperature demarcation is usually a late and irreversible manifestation and quite accurately locates the site of occlusion (Table I).

The diagnosis of neurologic involvement is quickly determined. Absence of neurologic reflexes, an area of paresthesia distal to the point of occlusion, and paralysis of the affected part all denote ischemia of the nervous tissue and subsequent permanent damage according to the time interval and severity of the ischemia.

The physician will immediately notice the partially or completely collapsed superficial veins upon inspection. Elevation of the involved part will produce complete venous collapse with perhaps evidence of increase in pallor (only if sufficient collateral circulation is entering the extremity). Dependency will demonstrate delayed or absent capillary filling and concomitant venous filling deficit, again depending upon the efficiency of the collateral circulation.

Arteriography is advocated by some authorities as an aid in visualizing the level and degree of occlusion. However, the argument arises as to the possibility of producing secondary thrombosis with the contrast medium passing through the collateral circulation or through a partially occluded segment. Many physicians feel that this diagnostic aid is not necessary and may be harmful on occasion. Its use should be restricted to difficult diagnostic cases.

The vital signs are not significantly altered unless disaster is impending.[9] Within 12 hours, there are temperature rises in 25 per cent of patients, pulse rate increases in 50 per cent, and increased respiratory rates in 12 per cent. The status of the blood pressure is related primarily to any predisposing cardiac disease and will also fluctuate according to the presence and degree of shock. There is no significant change in the hemoglobin content. However, the number of leukocytes increases to 10,000 to 20,000 in 55 per cent of patients. Urinalysis is usually not of any diagnostic aid, the results being related primarily to any concomitant renal disease. Later, as ischemia progresses to tissue necrosis, the laboratory findings will be altered as expected.[9]

As a mnemonic device, Pratt[2] lists the cardinal findings as the "six P's" of arterial embolism: pain, paralysis, paleness, pulselessness, paresthesia, and prostration.

To aid further in the diagnosis, the physician should recall two important facts: the usual lodgment of emboli at arterial bifurcations and the relative incidence of distribution of lodgment of emboli.

Differentiation of peripheral arterial embolism from other vascular disorders may seem unnecessary since the symptoms of this vascular phenomenon are rather distinct and pathognomonic. However, other vascular disorders may present a similar syndrome, as arterial thrombosis, acute thrombophlebitis (phlegmasia alba dolens and phlegmasia cerulea dolens), and arterial spasm. Early recognition, correct diagnosis, and institution of proper treatment increase the chances of a

favorable prognosis. Since the treatment and handling of the various vascular conditions are different, it is imperative that the differential diagnosis be carefully and quickly accomplished.

The essential diagnostic points of the two commonly confused vascular disorders along with those of arterial embolism may be summarized in table form for quick reference and comparison.[10]

TABLE II—DIFFERENTIAL DIAGNOSTIC CRITERIA OF ARTERIAL EMBOLISM AS COMPARED WITH ARTERIAL THROMBOSIS AND ACUTE THROMBOPHLEBITIS

	Embolism	Thrombosis	Thrombophlebitis
Etiology	Left-sided cardiac disease, auricular fibrillation—90%	Arterial disease and/or trauma	Postoperative, postpartum, chemical, trauma, or fungus—any age
Age	Any age, usually 20 to 40 years	Usually over 45	Any age
Onset	Usually sudden—80%	Gradually increasing symptoms	Gradual or sudden but not as explosive
Color	White or mottled	White or mottled	Dusky cyanotic to red
Skin Temperature	Cold	Lowered to cold	Warm to hot
Pain	Usually extreme—60%	Usually slight	Varies—may be extreme
Pulse	None	None	Normal unless spasm present
Swelling	None	None	Usually marked
Loss of Motor Power	Temporary loss	None or slight	None
Arteriography	Visualizes site of occlusion	Visualizes site of obstruction with evidence of arteriosclerosis	Negative
Circulatory Function Test	Markedly impaired or completely obliterated	Diminished	With spasm slightly impaired
Veins	Filling not present	Diminished or collapsed	Distended and prominent

In the rare cases of gangrene of venous origin (phlegmasia cerulea dolens) only careful clinical and anatomic demonstration of the patency of the arteries, along with the history, will differentiate the two conditions.

Simple or essential arterial spasm occurring in patients with severe hypertension or a failing heart has been reported. Its cause remains unknown. However, it is likely that most of the so-called simple arterial spasm cases occurring in association with cardiopathies are due to small migrating emboli. In differentiating the condition, spasmolytic drugs or paravertebral sympathetic block will be of great help.

TREATMENT

There has been much discussion of whether treatment of acute arterial occlusion should be medical or surgical. Statistics and the experience of numerous proponents of each method of treatment seem to verify and justify their particular choice of treatment. There are indications and conditions for both types of treatment, and many times management should include both. The surgeon who arbitrarily operates on a decompensated and obviously moribund patient is performing a disservice. Such a patient's primary problem is his heart, and if this can be corrected medically while conservative measures are instituted for the embolism, the patient has a chance for survival. However, the internist who keeps a younger patient on a medical regimen while gangrene of the involved extremity occurs also is culpable, especially if the cardiac status is fairly good. Experience and favorable results have caused a modification in practice while retaining in principle the dictum that the treatment of acute arterial embolism should be surgical as soon as the diagnosis is made.[2]

Furthermore, the decision to attempt surgical removal of the embolus must be quickly made, since the passage of even a few hours may render potentially successful surgery a failure. Generally, surgery may be attempted with a reasonable prospect of success if the embolus is at the bifurcation of the aorta or the femoral arteries, if a well-trained surgical and anticoagulant team is available, and if the operation is to be done within 12 hours of the onset of arterial occlusion. When the embolus is peripheral to these vessels or in the upper extremity, a conservative approach produces at least equally good end results.[11]

It must be kept in mind that embolectomy is performed only to restore the arterial circulation in the affected limb, and if the operation accomplishes this purpose, it is successful. Patients with embolism are poor risks because of their cardiac status, and only one in four patients will be alive in 5 years. However, without embolectomy, most of these patients will die. Thus the poor general prognosis should not be an absolute contraindication for surgical intervention.

When an artery undergoes partial or complete occlusion, either gradual or sudden, there are essentially five principles of treatment which when judiciously followed may minimize or reduce the ensuing ischemia and potential irreversible tissue changes.[12]

1. Protection of the involved extremity or part. If the affected acral parts are protected so that they are not injured by trauma or exposure in any way, the reduced blood flow may still be sufficient for limb survival. This is the case only if the metabolic need for blood by the tissue is not increased, as mentioned, by local injury, muscular activity, local heat, and the like.

2. Improvement and establishment of adequate collateral circulation by means of vasodilatation. Again, if the main arterial channels (main artery and collateral vessels) are not completely obstructed, procedures that can dilate the collateral vessels along with the arterioles or other small arterial vessels should produce an increase in the blood flow to the acral parts. This may be accomplished by reflex heat, intra-arterial medication, sympathetic block, et cetera, which could be measured by means of dermalor or plethysmographic studies. However, the difficulty here is that, with maxi-

mal peripheral dilatation, most of the increase in blood flow may be through non-nutritional channels, that is, the peripheral arteriovenous shunts which serve to regulate limb and body temperature. There can be no certainty that there has been an appreciable increase in nutritional blood to the ischemic tissue in any given case just because the total blood flow has apparently been increased.

3. Prevention of propagation of the embolus and secondary thrombosis. Anticoagulants should be given to prevent propagation of the embolus and secondary thrombosis and to treat the original source of the embolus. When an artery is acutely occluded by an embolus, this artery and the neighboring arteries usually are involved in intense spasm, which produces profound ischemia distal to the site of the embolus. If this ischemia persists for a long period, it produces changes in the intima of arteries and veins distally which cause extensive thrombosis when blood begins to run through these channels again. There is little doubt but that this is responsible for gangrenous changes in a large percentage of cases even after successful embolectomy, thus the necessity for anticoagulation therapy.

4. Removal of the obstructing embolus. Barring the persistence of spasm, the incomplete removal of the embolus (or any associated thrombus), and the occurrence of thrombosis at the operative site, the blood flow should return to normal with restoration of the lumen of the involved artery, as by embolectomy.

5. Cardiovascular support. The intra-arterial blood pressure influences the blood flow through the extremity. Thus, if the systemic blood pressure has fallen, as might occur in relation to the pain, shock, or the primary cardiac pathology, it is reasonable to attempt to return the blood pressure to its previous level by appropriate treatment. Also, the position of the limb and body imposes influences on the local intra-arterial blood pressure. These may apparently be used to advantage in attempting to increase the blood flow.

On the other hand, there are also three important "don'ts" in the treatment of sudden arterial occlusion: (1) Don't delay treatment as delayed treatment means a poor prospect of recovery in those instances in which recovery would not occur spontaneously. (2) Don't elevate the extremity. (3) Don't subject the extremity to heat which exceeds 95 F. (35 C.).[4]

To aid in determining the treatment of choice, medical and/or surgical, the following factors should be carefully considered.

1. Etiology of the acute arterial occlusion. Whether it is embolic or thrombotic in origin should be determined.

2. Site of occlusion. The exact location of the obstruction and whether it is surgically possible and practical to attempt removal of the embolus should be determined.

3. Time interval. The time elapsed between onset and diagnosis must be determined in order to evaluate the practicality of surgical intervention.

4. Status of the involved extremity. It must be determined if the occlusive process with its sequelae of color changes, paralysis, absence of pulsations, et cetera, has undergone regression or progression, or has remained static.

5. Patient's general condition. Cardiac status, state of shock, and the like must be determined.

6. Prognosis. It must be determined whether the occupation and desires of the patient warrant therapy that would increase the probability of saving the limb or of obtaining a more normal limb, even with the increased risk to life.

Medical Treatment.—

The following is an outline of suggested medical therapeutic measures which may be used individually or in combination in order to obtain the most favorable result.

Position of the Patient with Protection of the Involved Extremity: The patient should be restricted to absolute bed rest with the head of the bed elevated so that the extremity is at least 6 inches *below* heart level. The extremities should never be elevated *above* heart level. The extremity should be protected to prevent further trauma and preserve the warmth of the part, since it is more susceptible to maceration, pressure, infection, dehydration, thermal damage, and so on. A cradle is placed over the extremity which may be loosely wrapped in cotton. The room temperature should not exceed 90 F., and no heat or cold should be applied directly to the part.

Sedation: Opiates should be administered as soon as possible. Alcoholic drinks (½ ounce every 3 to 4 hours) serve both as an antispasmodic and an analgesic. Intravenous procaine (0.1 per cent or 0.2 per cent) or ethyl alcohol accomplishes the same result.

Reflex Heat: A heating pad applied to the abdomen or under the lumbosacral area has some value. Again it is stressed that heat (above 95 F.) and cold should never be applied directly to the involved extremity. Many limbs have been lost by the injudicious use of these agents.

Absolute Restriction of Tobacco: Because of the vasoconstricting effect of nicotine, tobacco must be forbidden.

Vasodilating Drugs: The use of papaverine hydrochloride (½ to 1 grain) intravenously or intra-arterially may have a marked vasodilating effect and can be repeated every 4 to 6 hours as needed. If the first injection produces little effect, further injections will probably be ineffective. Priscoline (25 to 50 mg.) intra-arterially has also been effective. This can be repeated every 3 to 6 hours. Oral or intramuscular vasodilators are of little value in this acute condition.

Physiotherapeutic Measures: The use of supposedly physiologic apparatus for the utilization of intermittent negative and positive pressure (pressure-suction boot and intermittent venous occlusion apparatus) has been generally abandoned. The use of the oscillating bed also has a limited value in the acute occlusive phase, its value being in chronic occlusive diseases.

Sympathetic Nervous System Interruption: Blocking of the vasoconstrictor impulses by interrupting the vasospastic phenomena can be accomplished by action on either the paravertebral ganglia (lumbar or stellate) or on the mixed nerves (brachial, caudal, spinal anesthesia). Because of occasional technical failure with paravertebral procaine blocks and the necessity of repeating the procedure every 4 to 6 hours, unless a continuous method is utilized, continuous brachial block or prolonged continuous spinal or caudal anesthesia may be utilized. There has been some criticism of the use of paravertebral procaine blocks concomitantly with anticoagulation therapy because of possible massive, and perhaps fatal, retroperitoneal hemorrhages. However, in my opinion, the two procedures are not incompatible if proper precautions are observed for each. A chemical sympathectomy also may be obtained by

(Continued on page 130)

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THE FAILURE OF MODERN MEDICINE

"Modern medicine" is the term of the moment applied to medicine. It has largely replaced "scientific medicine," inaccurate and untruthful as descriptive either of the goal or the practice of medicine. "Comprehensive medicine," an ambitious term, has not been broadly accepted, and its usage is more wishful than descriptive. If "modern" is applied to present-day medicine, it becomes meaningful only if it is understood within a medically historical framework. A sharply defining term, however, is employed by some of the critics of modern medicine who refer to it as "etiological," "remedial," or "curative" medicine.

JOURNAL readers will recall a cursory analysis of the *nature* of modern medicine was made in the July, 1955, issue.[1] It was pointed out that "etiological" or "curative" is properly descriptive of modern medicine, because such an adjectival usage reflects its central position, its total orientation, and its direction as flowing from its limiting approach to the problem of health and disease. To modern medicine medical truth lies within a specific etiology causal to a specific disease for which a specific therapy only awaits discovery.

Every critic of modern medicine lays himself open to more severe criticism as one impatient and unwilling to wait for medicine to continue its half-century march from discovery to discovery, its glorious advance from cure to cure. So single-voiced is the profession of medicine and so relatively few its critics that the adverse critic is immediately suspect as from without its rigorously staked pathway. Whereupon he is rated as unorthodox, sectarian, destructive of meticulously evolved standards, and a questioner of duly constituted authority. As a possible advocate of the new, the untried, the unproved, and the vague, he might be a crank. If he suggested modern medicine's need of a philosophy, he would be treading dangerously near to the cultist's grounds. From the time (1893) of Emil von Behring's unqualified advocacy of the specificity of disease and of therapeutic agents, as a whole, leaders in medicine and medical science have exorcised a philosophy of medicine as a betrayal of its objectives.

The critic from within organized medicine is effectively ignored. Articles that question the three-quarter century approach of modern medicine to the problems of health and disease find no place in journals following the official line.

Informed critics of modern medicine, whether or not they are within its organizational limits, agree generally on this premise: The "failure" of modern medicine is related directly to its nature, and not to its quality or completeness. This simply means that medicine as it is conceived, taught, and practiced—by almost all physicians—has serious shortcomings, so serious as to rate it *fundamentally* as a failure. And these critics dare put forth such a thesis at a time when modern medicine's triumphs, victories, amazing achievements, and continuing new wonders have reached a still greater height—witness the acclamation accorded the Salk vaccine.

Before we turn over the other side of the coin, however, let us take a brief glance at the achievements of modern medicine which are both statistically correct and overwhelmingly convincing.

Contagion was rampant during the closing decades of the last century when Still initiated a movement for medical reform and a new orientation of medicine, a movement indigenous to America and destined to become the osteopathic profession. By 1900 a male infant had a chance to live to be only 48.2 years old; the male infant of 1950 can be expected to live to the age of 65.5.[2] In 1900, pneumonia, tuberculosis, and diarrhea and enteritis accounted for more than a third of the deaths. By 1950 the leading causes of death were heart disease and cancer. From 1935 to 1950 the population increase in the United States was 18.4 per cent. During the same period, percentage-wise, the increase of persons 65 years old and over was 57.9.[3]

The gain in life expectancy in the half-century that has elapsed is more than 17 years. But most of that gain can be accounted for by persons under 20; as the years increase, life expectancy becomes subjected to a law of diminishing returns. At age 40 the increase in life expectancy is but 3 years, and at age 65, but 1 year.[2] It is evident that the gains of modern medicine are confined to its ability to conserve infancy and childhood.

Today's children have a chance to live much longer because of the triumphs of modern medicine. Mortality no longer overshadows the American child. But this prideful life expectancy takes no reckoning of the 25 million individuals—one-sixth of our total population—who suffer from such chronic illnesses as cardiovascular diseases, the nephritides, peptic ulcers, meta-

1. Editorial: The nature of medicine. J. Am. Osteop. A. 54:673-674, July 1955.

2. Galdston, I.: The meaning of social medicine. Harvard University Press, Cambridge, Mass., 1954.

3. Galdston, I.: Homines ad deos: or The clinical bull in the ecological china shop. Bull. Hist. Med. 28:515-524, Nov.-Dec. 1954.

bolic and endocrine disorders, and the tremendously mounting involvement with neurologic and mental disease. This listing names only major illnesses, and mention must be made of minor illnesses of a chronic nature; hundreds of thousands are afflicted with hernias, hemorrhoids, varicose veins, and chronic sinusitis, none of which endanger life, but which take a social and economic toll and hamper well-being.

Still more serious is the fact that more than half of the 25 million with major chronic illnesses are under 45 years of age.[2] Costs of their care taken with the costs of their lost productive capacity run into staggering figures that spell a dismal future for our economy. It is in the 65-years-and-over age group, however, that chronic disease takes its heaviest toll. A study of the reports of the U.S. Public Health Service reveals that in the older group the duration of illness is more than three times greater than it is in the general population. Two-thirds or more of "days disabled" that occur in the general population, and about 90 per cent in the old-age category, result from chronic diseases.[3]

The dourest critic of modern medicine will give it full credit for the chance it has given to the children of this mid-century to reach a mature life—would that it were all to the good, the child to be crowned by years of creative and productive living, rather than saved to become a burden to himself and to society. It is the first order of medicine to save life and to combat mortality, but not to the end that the price of victory over death for the child be changed to a death in life of the aging and the aged, the individual to become a thorn to himself, a hardship to those nearest him, and a loss and a burden to society. Not to challenge medicine on this score is to corrupt it further by failing to call it back to its ultimate purpose long shared with religion—to give man a full measure of life, and to give it abundantly.

An article in the JOURNAL, by Irvin M. Korr,[4] the physiologist, dealt with the potentiality of osteopathic medicine as a fundamental approach to the treatment and prevention of chronic disease and emphasized man's increasing morbidity. Korr differentiated, as so many observers fail to do, between a reduced mortality rate and improvement in health and well-being. He sees the problem of growing disability incident to chronic degenerative diseases as one fast mounting, and made inevitable by the challenge of our aging population. The figures that he quotes help to confirm indirectly the thesis of this editorial:

> Persons over the age of 65 have quadrupled since the beginning of the century while the entire population has only doubled. It is predicted . . . that by 1980 approximately 40 per cent of our population will exceed 45 years of age; more than 20 million persons will be over the age of 65.

Within the implication of so portentous a future, Korr[4] points out that "Man is thus being spared early death by the infectious diseases, only that he may succumb at a later age to the misery and disablement of chronic disease." He quotes Edward J. Stieglitz, the distinguished geriatrician, on the seriousness of having so large a section of our population disabled: "The burden of chronic disease is both individually and collectively far greater than the social consequence of high mortality from acute illnesses." Yet it is tremendous victories over acute illnesses that characterize the achievements of modern medicine. Such achievements offer no hope to a society increasingly weighed down by an aging and chronically ill population. Herein modern medicine has failed, even to the point that it has little awareness of failure.

Curative medicine stands condemned not for what it has accomplished, but for what it has failed to accomplish. This failure has nothing to do with the fact that medicine has as yet no cure for cancer, for essential hypertension, or for multiple sclerosis, to name but three. Victorious over these, and many others, modern medicine would still have failed. For man has yet to learn how to meet his fundamental medical needs, needs of which modern medicine has no awareness.

The failure of modern medicine is inherent in its nature and flows out of it as night the day. Etiological medicine, triumphant in its victories, holds within itself the seeds of its own defeat. Preoccupied with diseases and their treatment, modern medicine has little time or effort left to study the nature of disease, nor is it moved to the need for such a study. Medical education thoroughly conditions the doctor to ask one question: "What has the patient got, and what shall I do for it?" And there he, and a curative medicine, stops.

In another section of Korr's article referred to above, he again quotes Stieglitz: "The concept of specific etiology, so finely phrased by Koch in his postulates and blindly followed by generations of bacteriologists and clinicians, has retarded progress in etiologic analysis for many years." Korr follows with as succinct an analysis of the central position of modern medicine (etiological medicine) as can be found in the literature, emphasizing that modern medicine with its distinct nosography and specific therapy is eager and competent to treat man's acute illness, but is little concerned with his ill health.

The reality of specific disease causation and of specific therapy became fully victorious at the close of the last century. It so overwhelmed those who build and guard medical structure that they gave no thought to the possibility or necessity of a more fundamental design. They see the future of modern medicine as clear-cut and simple—discover new etiologies and invent new treatments—in time, no more disease.

The critics of a curative and remedial medicine are not numerous, and they are far in the vanguard. They belong to no one organization, no one school of medicine, nor to the medical profession alone. They cross all lines. They are scientists interested in the broad fields of man's welfare, scholarly doctors of medicine unafraid to doubt, and seminal thinkers in every field of knowledge who know that the seed they plant may take a century or more to mature. They are men concerned with man in his totality. They hold the health and well-being of total man to be the primary charge upon medicine.

The failure of modern medicine is not a dramatic thing; hence, it is beyond the technics of modern journalism where only matters of common preoccupation hold the central position. It poses no immediate

4. Korr, I. M.: Somatic approach to the disease process. J. Am. Osteop. A. 51:201-205, Dec. 1951.

problems, rather it is a call to re-examine the whole structure of medicine. Its eventual solution is totally beyond the power of living men and organizations; it awaits the working of historical and social forces present throughout society. Fortunately, however, there is a growing awareness that the nature of modern medicine does not embrace all that is pertinent to the comprehension, diagnosis, care, and control of disease. It seems probable that in the next half-century modern medicine will find itself sharply and severely questioned. If that is done, "the public itself must and will in time demand something more effective than curative medicine." Such is the opinion of one of modern medicine's ablest and most trenchant critics, himself within organized medicine.[2] There must be a broad awakening to the fact that what is now unknown and unmanageable as factors in meeting the problems of health will not be resolved by the approach used by medicine for almost a century.

Then it was—almost a hundred years ago—that medicine took to a single track. This marked the time of a seduction of medicine—name the disease, find the cure. To modern medicine it has become a codified tradition. The brilliant achievements of a bacteriologic and specificist medicine have blinded modern medicine not only to what it has failed to accomplish but to the fact that the specificist road can never lead it an achievement in depth.

The osteopathic profession is especially concerned with its own role in the health care of this nation. Its leaders are being challenged to prove the worth of osteopathic medicine to society. Neither the members of the profession nor its friends can appreciate the place of the osteopathic movement today unless it be seen in its relation to modern medicine. That requires that the nature of modern medicine be analyzed and its failures recognized, thereby to lay bare the roots of osteopathy itself and understand its failures. This ambitious undertaking can be no more than indicated by the statement that has recently appeared on these pages,[1] by this present statement, and by one to follow on the nature of osteopathic medicine. These statements—in reality of but one piece—are made in the hope that such a glimpse will stimulate more thorough study, not only of osteopathic medicine, but of total medicine in relation to the life of our time.

CLINICAL STUDY PROJECT

Clinical study projects are now being formed profession-wise under the auspices of the Committee on Clinical Study, George W. Northup, D.O., chairman. The entire project, which has been the subject of editorials in the February, 1954, and August, 1954, JOURNALS, bids fair to become one of the profession's most noteworthy undertakings—it could be the most significant in its history. The success of this movement, long overdue, to record, report, and correlate clinical observations as they relate themselves to osteopathic principles, is totally dependent upon the cooperation of individual doctors of the profession or groups of doctors. The Committee on Clinical Study has been quietly and consistently working on the project as a whole since its initiation in July, 1953, by the Board of Trustees of the American Osteopathic Association.

Although preparation for the project has been as basic and thorough as the project is large, it has been accomplished without fanfare. The Committee has had the help of many clinicians. It has developed the tools and technics for reporting. Initiation of actual projects is now ready for the thoughtful and exact planning of hundreds of doctors needed to make the total project a success. To inform and advise doctors of their role, the Committee has prepared a manual for possible distribution to the entire profession. A postcard request to the Committee on Clinical Study, American Osteopathic Association, 212 East Ohio Street, Chicago 11, Illinois, will insure receipt of a copy. In reporting editorially on the appointment of the Committee in July, 1953, by A.O.A. President Eggleston and its approval by the Board of Trustees, THE JOURNAL made this comment in its February, 1954, issue:

> In reality, osteopathy is in its phase of challenge in which we must demonstrate in a manner not open to question its distinctive contribution to the age old art of healing and the newer science of medicine. That demonstration must be in the terms of fundamental and clinical research. The Committee on Clinical Study has pledged itself to the furtherance of the clinical aspects of this program of demonstration, believing that back of the Committee and working with it is the profession itself.

The project as developed by the Committee on Clinical Study is now at a point where it commands the informed interest of all osteopathic physicians; it is related closely to the day-by-day program of every osteopathic college and hospital. Conceived with a breadth of vision too often lacking in medicine, the project is actually a very practical thing, awaiting a matching breadth and working implementation by each doctor who reads this statement.

HEALTH: AN OSTEOPATHIC PUBLICATION

Every member of the osteopathic profession is asked to give his special attention to the 42-year-old rechristened and redesigned "Osteopathic Magazine." HEALTH is committed to render a service to human beings in terms of giving them health information, not as a special kind of truth, but as authentic information that does not restrict truth. HEALTH is an osteopathic publication, but it is not osteopathic propaganda. It will not segregate osteopathy from the great body of medicine, neither will it neglect to point out the close relation of osteopathic physicians and institutions to the health needs of people.

HEALTH will furnish information and education not readily found elsewhere. It will follow the needs of its readers as well as lead them to develop broader interests for their own benefits. It will succeed if the osteopathic profession, individual doctors, and all friendly groups lend their help to solve the problem of distribution, which must be extended far beyond that of a doctor-to-patient readership. The beginning of a solution can be made through a community readership, built around the doctor's interesting his own local organizations, auxiliaries, and institutions—getting the magazine into many hands.

Notes and Comments

Smoking and Lung Cancer.—

Association between smoking and lung cancer has been subjected to a critical statistical study by Joseph Berkson, M.D., chief of the Section of Biometry and Medical Statistics of the Mayo Clinic, in the July 27, 1955, issue of the *Proceedings of the Staff Meetings of the Mayo Clinic.* Dr. Berkson questions the validity of the recent statistics linking lung cancer with cigarette smoking because he feels that an unintended selective mechanism may have caused a comparison to be made of groups which were not truly comparable. He states:

. . . the data of the American Cancer Society study taken as a whole exhibit prima facie evidence that they have been subjected to a kind of selection which can produce association in the data studied, such as in fact was found in these data, even if the association does not exist in the primary reference population.

The findings in this study also indicated increased death rates among smokers for cancer other than of the lungs, coronary heart disease, and all other diseases for which the statistics have been studied. The author's conclusion was:

It does not seem unfair to say that, so far as the American Cancer Society study is concerned, the hypothesis of causation of cancer of the lungs by smoking stands or falls with the conclusion that smoking causes also other cancer and also coronary heart disease and also other diseases than either cancer or coronary heart disease. Indeed, the question raised by the findings in the American Cancer Society study of higher death rates among cigaret smokers is not, "Does cigaret smoking cause cancer of the lungs?" so much as it is, "What disease does cigaret smoking not cause?"

Dr. Berkson notes that his study does not necessarily indicate that no correlation does exist between lung cancer and smoking and adds:

A check will be available when prospective studies have continued long enough. Experience of insurance companies indicates that selection effected by initial medical examination, and by self-selection is "worn off" in about 3 to 5 years. After about that time we may expect that the age-specific death rates of the sampled population as a whole should approximate those of the general comparable population. If after, say, 5 years have elapsed since the beginning of the study, comparison is made of the death rates of smokers and nonsmokers over a 2-year period, referring only to the individuals who have survived 3 years, and the differences between smokers and nonsmokers are found to be just as large as earlier, it will be reasonable to conclude that the importance of selection in the sense discussed in the text is negligible.

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A Unique Service.—

John Henry Raymond Nettleship, 56, president of the insurance company which bears his name, died at his home in Malibu, California, July 20, 1955. Mr. Nettleship was widely known and highly esteemed in osteopathic circles. He was instrumental in obtaining professional liability insurance for the American Osteopathic Association in 1931, and his firm has served the Association as its official agency since that time.

Born in London, England, Mr. Nettleship had lived in the Los Angeles area for the past 50 years. He attended local schools and was a graduate of the University of California. During World War I he served with the 143rd Field Artillery, and was an instructor at the Yale Military Academy following the Armistice. In 1922 he became the head of The Nettleship Company and served continuously in that capacity until his death, except for a period of active duty as a lieutenant in the U.S. Navy in World War II.

Mr. Nettleship was a member of the faculty of the College of Osteopathic Physicians and Surgeons for many years, lecturing to senior students. He gave this Association and its members a dedicated service unique in the history of similar bodies. The relationship was more than a business—it was a guidance that concerned the ethics of medicine as they apply alike to doctor and patient.

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Chemotherapy of Cancer.—

Chemotherapy against cancer will be studied under a program recently inaugurated on a national basis by organization and government agencies concerned with this field of medical science, according to a report from the Cancer Chemotherapy National Committee. The Committee will give general guidance to the program which is being sponsored by the American Cancer Society, Atomic Energy Commission, Damon Runyon Memorial Fund for Cancer Research, the Food and Drug Administration and National Cancer Institute of the U.S. Department of Health, Education, and Welfare, and the Veterans Administration. The Committee also designated an advisory group for liaison with the pharmaceutical and chemical industries. The sponsoring agencies are maintaining a full-time staff to administer the program, provide information, and give assistance to research chemists. The staff will be located at the Cancer Chemotherapy National Service Center in Bethesda, Md., under the direction of K. M. Endicott, M.D., who is executive secretary of the Committee.

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Mephenesin in Cerebral Palsy.—

The use of mephenesin in a difficult phase of dental practice was described by Manual M. Album, D.D.S., in *The Journal of the American Dental Association* for July, 1955, under the title, "Clinical Observations on Use of Mephenesin in Cerebral Palsy Patients." Dr. Album observed that ". . . the relaxation obtained with the drug made it possible to treat these patients in a more normal manner." Feeling that this is of great value, the author notes:

The dental care of cerebral palsy children has been always difficult. These persons, particularly the ones who have not had speech therapy, have poor control over the muscles of the mouth or throat. Usually they are apprehensive and many are unable to keep the jaw in position for a long period of time. They can close it with the strength of a vise, however, thus making it difficult as well as hazardous for the dentist to carry out any work.

With obvious relief he adds:

The use of mephenesin made it possible to treat many of the patients more comfortably and safely. The experience has been, however, that even with mephenesin it was not possible to relax all patients sufficiently so that hospitalization and the use of general anesthesia could be avoided. Approximately 10 per cent of the patients fall into this latter category.

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Prognosis in Myocardial Infarction.—

"The Immediate Prognosis in Acute Myocardial Infarction," by Henry I. Russek, M.D., Consultant in Cardiovascular Research, U.S.P.H.S. Hospital, Staten Island, N.Y., discusses the outlook for those who have suffered from this affliction in the July, 1955, issue of *Clinical Medicine*. Dr. Russek points out that the usual mortality rates do not take into account the fact that there is a wide divergence in the mortality following heavy, severe attacks and that following lighter attacks. He comments:

Although the physician cannot foretell the future with any certainty in acute myocardial infarction his clinical judgment and his knowledge of the laws of chance should enable him to make a fairly accurate prognosis in each case. Just as the development of severe and persistent shock carries a mortality rate of 80 to 100%, it should be similarly recognized that the death rate in good-risk cases does not exceed 3%. The danger of sudden unexpected death in persons sustaining an uncomplicated first attack is therefore considerably less than has been previously realized . . . while the basis for optimism appears clear, overconfidence and carelessness on the part of both physician and patient may lead to unfortunate results if unwarranted liberties are taken.

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Treatment of Mental Patients.—

The Veterans Administration Information Service recently announced that long-term mental patients in VA hospitals are being aided in making a transition from the hospital to the world outside by being employed in the hospital for a period of adjustment. The jobs filled are regular civil service positions, for which the patient-employees are paid salaries. They live in the employees section of the hospital and are treated as employees in every respect. In addition to salaries and quarters they are provided with meals, laundry, and medical and dental care. Members of the hospital staff help in making the transition from patient to employee and aid in preparation for life in the outside world. The program, tested for 2 years by Dr. Peter A. Peffer in the VA hospital at Perry Point, Md., has been adopted by nineteen VA neuropsychiatric hospitals which have living quarters for employees. Of the 345 patients who have been placed in the program 111 have already left hospitals and are apparently making a good adjustment in ordinary life, 90 have been readmitted for further treatment, and 144 are still working as member-employees. The VA feels that the program requires further evaluation because it is relatively new, but that results to date are encouraging.

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New Drugs.—

The Food and Drug Administration, U.S. Department of Health, Education, and Welfare, recently announced that New Drug Application No. 10,000 had been filed as required by the Federal Food, Drug, and Cosmetic Act of 1938. Commenting on the cooperative attitude shown by the pharmaceutical industry in the observance of safeguards surrounding the introduction of new drugs, Commissioner George P. Larrick said ". . . the industry's compliance with the new-drug requirements of the law has on the whole been exemplary." According to information provided by the Food and Drug Administration, new drugs can not be legally marketed until the manufacturer has made an effective application which must contain the following information:

1. Full reports of investigations which have been made to show whether or not such drug is safe for use.
2. A full list of the articles used as components of such drug.
3. A full statement of the composition of such drug.
4. A full description of the methods used in, and the facilities and controls for, the manufacture, processing, and packing of such drugs.
5. Such samples of such drug and of the articles used as components thereof as the Secretary may require.
6. Specimens of the labeling proposed to be used for such drug.

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In Briefer Form.—

"The Pattern of the Development of Resistance to Carbomycin (Magnamycin) in Micrococcus pyogenes var. aureus" was the title of a paper prepared by Jen-Yah Hsie and Richard Kotz of the Department of Microbiology of the Des Moines Still College of Osteopathy and Surgery and published in *Bacteriological Proceedings*, 1955. . . . "The Value of Tuberculin Testing," by Daniel Jackson, M.D., in the *A.M.A. Archives of Internal Medicine*, June, 1955, calls attention to the fact that tuberculin testing is still a valid procedure. According to Dr. Jackson, ". . . tuberculin has proved to be safe and reliable and to have a low percentage of error. For clinical use and practical purposes, the absence of a positive tuberculin test rules out the presence of tuberculosis." . . . The first construction project to be approved under the Medical Facilities Survey and Construction Act of 1954 will be a fifty-three-bed nursing home addition to the Pinal County General Hospital at Florence, Arizona. It will be used primarily for nursing and medical care of aged persons who are presently occupying more than 12 per cent of the beds in the Pinal County Hospital but who could be satisfactorily cared for in a nursing home. . . . The 1955 edition of the Manual of Serologic Tests for Syphilis has been released by the U.S. Public Health Service. The manual (Public Health Service publication No. 411) may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. The price of a single copy is $1.00. . . . Recent figures released by the American Hospital Association reveal that in 1954 United States hospitals provided care to 20,345,431 patients. This is an all time high. . . . "Infant Care," published by the Children's Bureau, was recently revised. The new edition has a new section on the care of premature babies and gives increased emphasis to the need for precautions against accidents. Copies may be obtained from the U.S. Government Printing Office, Washington 25, D.C. The cost is 15 cents.

SPECIAL ARTICLE

The Health of the World*

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It is particularly appropriate that international health should be a keynote subject this year when the world is celebrating the tenth anniversary of the United Nations. Today is indeed a day of very special significance. At this moment we can assume that President Eisenhower is meeting with the heads of state of England, France, and the USSR at the Summit Conference on which so much of the world's hopes are based.

The Summit Conference is being held in the Palais des Nations, which is the home of the World Health Organization, where its headquarters staff is located, and where it holds its annual Assemblies. It is being held in the room used by the WHO for its Executive Board sessions, a room magnificently decorated by the great murals of Sert, symbolizing man's progress in technology and his emergence toward freedom and peace. One of the panels which the heads of state have in front of them at this very moment symbolizes in dramatic fashion man's conquest of disease as a major element in the struggle toward peace.

It is recognized by diplomats, as well as by doctors, that one of the major social problems of our day relates to the health of the great mass of the world's population. We who live in a healthful environment and have tucked away in the remote recesses of our memories such scourges as malaria, smallpox, typhoid, and dysentery are apt to be unaware of, or insensitive to, the great burden of disease that is holding down economic and social progress in vast areas of the world and, indeed, impeding the establishment of the necessary human base of permanent peace.

In the great struggle to preserve freedom, one of the facts that must be faced is that the mass of mankind—some 1,600,000,000 persons—lives in "underdeveloped areas." A characteristic of such areas is the wide prevalence of mass disease, most of which is preventable. Disease brings with it—or is intimately united with—poverty, ignorance, and discontent. This combination provides a rich soil for the growth of communism.

It is encouraging to be able to report that there is great activity abroad in the field of health; that the peoples of the world know they can have a better life and are acting in concert to bring it about.

The scope of the problem of health is suggested by the fact that the span of life in most of the world is somewhere between 30 and 40 years, whereas we have now attained a life span of 70 years here in the United States. Infant mortality still ranges between 200 and 300 deaths per year among each 1,000 live births in many countries, whereas ours is now well below 30 per 1,000. Until very recently, one fourth of the population of the world has been exposed to malaria, over half that number suffering from the disease each year with cumulative deleterious effects upon physical energy, mental alertness, and initiative. Over 80 per cent of the people of Egypt suffer from schistosomiasis, a chronic debilitating infestation with liver flukes; over a billion of our fellow men have chronic enervating worm infestations—hookworm, roundworm, tapeworm, et cetera. Tuberculosis, which is rapidly declining in the more advanced countries, continues as the "white plague" among the poverty stricken masses of the less highly developed countries.

The picture would be a grim one indeed if it were not for the fact that the world has awakened to these distressing conditions and now has tools with which to ameliorate them to a considerable degree. The new insecticides, such as DDT, antibiotics such as penicillin, and vaccines effective against yellow fever, and to a lesser extent against tuberculosis, have come to hand at a time in which there is a clamor for help. At the same time, recognition of the dangers latent in filth and contamination have spread widely throughout the world.

People in areas that are remote—geographically or socially—have learned, through modern means of communication, that there are ways of gaining freedom from pain and suffering and of attaining a more abundant life. The move for national independence and freedom which characterizes the world scene today is basically an effort to attain a better life in which health is a major element.

Fundamental sanitation is a crying need in the vast underdeveloped areas of the world. In Iran, for example, there is only one city, Shiraz, that has a closed water system. This was donated by an individual. In the capital city, with a population of 1,000,000 persons, water reaches the city as clean water from underground mountain streams. It then runs through open gutters, called "jubes," about 1½ feet wide and 2 feet deep, interconnected as a complicated distribution network which is controlled by sluice gates directing the flow in accordance with the needs of each section of the city. Water flows continuously in these gutters in the business area, but in the less densely populated residential area the flow is intermittent, the water being piped to open pools in individual back yards and, from there, pumped to a storage tank on the roof. All manner of filth, sewage, garbage, and refuse gravitates to the jubes. Urban and village water supplies throughout Iran follow the Teheran pattern.

The problem of filth applies not alone to cities, but to villages as well. The problem of sanitation in the Egyptian village is well known and has been studied and tackled, without much success to date, by the Egyptian government and a number of agencies from outside Egypt. The difficulty in Egypt, as in some other parts of the world, is poverty coupled with overpopulation. There is no direction in which to expand to obtain room for clean, healthy living. Every square inch of arable land surface is exceedingly precious, yielding three crops a year. Villages cannot expand vertically, layer on layer, because the only building material at hand is mud. Domestic animals live intimately with the family, a water buffalo often occupying three quarters of the living compound. Animal dung, accumulated

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through the years, serves as the carpeting. Fresh dung is carefully hoarded in a corner of the compound, and in yet another corner is a pit privy or more open facility. There exists not only an economic problem in separating animals and people, but also a social, cultural and emotional problem. The Rockefeller Foundation worked in the village of Sindbis for some 4 years and found that the Egyptian housewife treasures the companionship of the family animals just as many of us do that of our dog. The dung that accumulates is of such great value as fertilizer and fuel that families do not dare store it outside their homes for fear that it will be stolen. These fundamental economic, social, and psychologic forces work against efforts to improve sanitary conditions, but sanitation must be improved if health is to progress.

Another vast problem relates to insect control. The extent of malaria is not known. Sometime ago, the World Health Organization (WHO) estimated that there are 300 million cases per year in a total world population of some 2½ billion persons. Now some 225 million of the exposed population of 500 million are protected against the disease. The United States, Greece, Italy, Venezuela, and certain other countries have brought it under mass control. The WHO and, in this hemisphere, its Regional Office, the Pan-American Sanitary Bureau, have embarked on campaigns aimed at the actual eradication of malaria within the next 10 years. It is believed that this can be accomplished within that time, with the possible exception of Africa, which presents certain technical difficulties not yet conquered.

Throughout the world there is a hum of activity in health; the less well-developed countries are extending their health services widely. Ministries of Health have been established everywhere and given cabinet status in most countries. These ministries are being staffed by persons trained in the schools of public health in the United States, England, Chile, Brazil, and other countries. Within them, new departments are being established in the fields of public health nursing, sanitary engineering, health education, and related disciplines.

Recently I have had occasion to visit health centers in India, Thailand, and the Philippines. In each of these countries—and they are only examples—there is intense activity in the development of health services throughout the rural areas. This is true as well in Iraq, Egypt, Mexico, Brazil, and elsewhere. Health centers with services radiating into the homes from the hub of medical care are now extending widely through the underdeveloped areas. They number in the thousands. The scope of activity is new and phenomenal and most heartening.

The World Health Organization is playing the major role in the great health movement that is underway today. It is an agency that should be understood by all Americans. At the San Francisco Conference 10 years ago, Brazil and China took the lead in having health recognized in the Charter of the United Nations as an area of appropriate interest and activity for the organization that was a-borning. As a second step, Brazil and China proposed a joint declaration, which was unanimously approved, calling for a world health conference to establish an international health organization.

Acting on this, the newly created Economic and Social Council of the United Nations convened a Technical Preparatory Committee in Paris in March, 1946, and an international Health Conference in New York in June of the same year.

Out of these two meetings, held so soon after the San Francisco Conference, came the plans and constitution for the World Health Organization. At the conference in New York, delegations from all of the 51 United Nations took part. In addition, representatives of 13 nonmember nations, 3 allied control authorities, and 10 international organizations attended as observers. On July 22, 1946, representatives of 61 nations signed the Constitution of the World Health Organization. Never in diplomatic history had there been such unanimity of action by the official spokesmen for such a huge section of the world's peoples.

It was agreed that WHO would formally come into being when 26 members of the United Nations accepted the constitution. On April 7, 1948, the required number of acceptances was completed, and in honor of that occasion, April 7 is celebrated each year as World Health Day. The first Assembly met in June, 1948, at which time 56 States were active members of the Organization. Since then WHO has grown to be the largest of the international organizations in terms of membership, with 80 countries as members and 5 non-self-governing territories as associate members. It is also the largest, next to the United Nations itself, in staff, with 1,300 employees.

In day-to-day operation, WHO functions through its Secretariat in Geneva, under Dr. Marcolino Candau of Brazil as Director-General; its six regional offices (in Washington, Copenhagen, Brazzaville, Alexandria, New Dehli, and Manila); and its staff working on projects in the field. The World Health Assembly, which meets annually to determine international health policy and program, is the Organization's legislative body and is composed of representatives of all the member countries. The Executive Board is composed of 18 health experts designated by as many member countries, serving in their personal capacities as experts rather than as representatives of their governments. The Board, which normally meets twice a year, gives effect to the decisions and policies of the Assembly and takes action to deal with matters requiring emergency attention. The Regional Committees, composed of representatives of the member countries in each Region, formulate regional policies and supervise the activities of the Regional Offices. The structure of the Organization is completed by over 30 expert panels and committees. These are composed of specialists in the various fields of public health drawn from the member countries to advise WHO, on a part-time basis, on the technical aspects of its activities.

The most important of the functions of the WHO is the assistance it gives countries in strengthening and improving their own health services. This concept of assistance is of cardinal importance in the Organization—it is not a supranational health ministry, but instead a world-wide cooperative through which the nations help each other to help themselves in measures to improve the health of their peoples. WHO enters the picture by providing, upon request, public health experts, demonstration teams for disease control, visiting specialists, and consultants.

An example of such service and assistance can be found close to home. For years, rabies in wild animals along the United States-Mexico border has been a serious problem, with considerable danger to humans. Bat rabies, in particular, has gradually spread northward, and infected bats have even been found in such

scattered locations as California, Florida, and Pennsylvania. For some time the WHO, through the Pan-American Sanitary Bureau, has studied the problem and has participated in demonstration control projects which have led to joint action by the United States and Mexico in the control of this dangerous situation.

Many other parts of the world see inspiring and dramatic examples of WHO's work. In the Terai, a vast fertile plain in northern India extending along the foothills of the Himalayas, malaria has been an extremely serious health problem. In May, 1951, a WHO demonstration team began cooperating with the Indian experts in a pilot malaria control project. After 2 years the program was successfully concluded with the transmission of malaria virtually stopped. Population of the area has already increased 50 per cent, largely because of immigration; food production has tripled because available manpower can work the fields rather than lying helpless from the ravages of malaria; good housing is being constructed, as are banks, schools, hospitals, and other structures, on land that was a few years ago malarious jungle—in fact, a favorite tiger hunting area; factories and roads are being constructed; and land values have risen from nothing to $40 to $60 an acre.

In addition to the advisory services, the WHO provides its member countries with a variety of services grouped under the heading of Central Technical Services. These services cover development of various international standards such as internationally acceptable standards for the strength, purity, and composition of drugs; service as a clearinghouse for the exchange of technical health information; and collection and dissemination of epidemiologic information and health statistics.

An outstanding accomplishment of WHO is the development of the International Sanitary Regulations to replace earlier and less comprehensive international conventions in this field. Although member countries had the option of rejecting the Regulations or accepting them with reservations, by October, 1953, 136 countries and territories had accepted them completely and only 8 had made any reservations. Such widespread observance of standard regulations goes far toward blocking the international spread of disease. That job has been made doubly valuable by the use of the daily world-wide telecommunications system, coordinated by WHO, and by which national health administrations are advised of occurrences of major diseases throughout the world, so that they may take necessary quarantine and preventive measures.

We, as Americans, can derive considerable satisfaction from what our government is doing. In addition to active participation in the World Health Organization and the Pan-American Sanitary Bureau, we are carrying on cooperative activities under the program widely known as Point Four, on a country by country, or bilateral, basis with some 38 of the so-called underdeveloped countries. In each of these there are missions, staffed by American public health technicians—a total of over 400—who are working intimately with the Ministries of Health to assist them in developing their services. Before World War II the United States was contributing $6,000 per year to the International Office of Public Health in Paris and $60,000 per year to the Pan-American Sanitary Bureau. Now we are contributing between $40 million and $50 million per year through the World Health Organization, the Pan-American Sanitary Bureau, the UN Children's Fund, the UN Technical Assistance program, and the bilateral programs toward the betterment of world health conditions. These funds are matched by other governments. We give, for instance, but one third of the funds of the WHO. Through the bilateral programs our contributions are matched on a varying basis, in some places dollar for dollar, but in most places 3 or 4 or 6 or 10 dollars to our 1 dollar. What we are contributing is serving as a catalyst and facilitating the speeding up of a truly world-wide movement.

The international health movement is highly significant in that it is releasing human energy for productive use; opening up new lands, particularly in the tropics; and inspiring new hope in the hearts of men. These are the ingredients of progress; these are the ingredients of freedom. This is an avenue through which we can contribute daily, without screaming headlines, to the continuous upward progress of mankind.

PERIPHERAL ARTERIAL EMBOLISM—HICKMAN

(Continued from page 122)

utilizing the sympathicolytic or adrenolytic drugs such as Etamon, Dibenamine, and Priscoline. However, the effect is general and not localized, and hypotension usually results which may be detrimental to the survival of the extremity.

Anticoagulants: The necessity for anticoagulation therapy in preventing propagation of the original embolus and secondary thrombosis has been stressed. However, anticoagulant therapy has definite contraindications, as in the patient with advanced hepatic or renal disease, active pulmonary tuberculosis, bleeding peptic ulcer, or blood dyscrasias in which there is a tendency toward bleeding. Furthermore, hemorrhage may occur even when the utmost care is observed in the administration of antithrombotic drugs.

The use of heparin initially, either intravenously or intramuscularly, to increase the coagulation time of the blood to a level between 20 to 40 minutes (normal being 5 to 15 minutes) is necessary for the immediate effect. At the same time or later, following receipt of essential laboratory data, oral anticoagulants (Dicumarol, Tromexan, Hedulin, et cetera) are given to increase the prothrombin time to 10 to 30 per cent of normal. Heparin is usually continued only until the lag period of the oral anticoagulants is overcome and the prothrombin time is reduced to the therapeutic level. This period may be from 24 to 72 hours, depending upon the choice of oral anticoagulants. Anticoagulation therapy is usually continued for a period of weeks.

If early surgical intervention is contemplated, the antithrombotic action of heparin may be counteracted, if necessary, and surgery performed without danger of uncontrolled hemorrhage.

Surgical Treatment.—

If conservative measures fail to restore collateral circulation within 2 to 4 hours, surgical intervention should take place without further delay, whenever possible.

Embolectomy: This, the actual removal of the obstructing embolus and associated thrombus at the site, is the surgical procedure of choice. Direct exposure of the vessel at the site of occlusion under local anesthesia is believed to be of primary importance to surgical success. However, the direct approach is not advocated for those emboli at the bifurcation of the aorta or iliac arteries, owing to increased operative trauma, time, and anesthesia, unless absolutely necessary and indicated. It should be mentioned that embolectomy is usually unnecessary if the embolus is in an upper extremity, and the procedure is likely to be harmful if the embolus is in the lower extremity distal to the popliteal artery.

Sympathectomy: This surgical procedure is usually deferred since it submits an acutely ill patient to further shock and trauma. Again, the local sympathetic blocks (interrupted or continuous) are usually adequate without the added burden of sympathectomy. However, sympathectomy may be done later to obtain a permanent effect if desired and indicated.

Arteriorrhapy: This procedure is usually reserved until the acute occlusive process has resolved itself. If the occluded site is segmental and the symptoms warrant it, thromboendarterectomy or homologous graft transplant may be attempted to correct the obstruction.

Arteriectomy: Leriche, Froment, and Vachon[13] first advocated this procedure in 1934. Its mechanism of action seems to be twofold: First, by suppressing the occluded arterial segment, it eliminates the starting point of vasoconstrictor reflexes, and, second, by inducing an active vasodilatation, it stimulates the restoration of the collateral circulation.

The chief indications are in late cases (after 12 to 24 hours) with damaged arterial intima, in cases of local secondary thrombosis after arteriotomy, or in cases of chronic postembolic ischemia.[3] However, it is felt that this procedure is of value only when other methods have failed and that it should not be utilized in preference to more accepted procedures.

Amputation: When all measures have failed and gangrene occurs, amputation becomes unavoidable. The operation should be delayed, if possible, until spontaneous demarcation of the necrotic parts occurs, since the site of amputation may be lower than originally planned. However, if signs of infection and/or toxemia occur, surgery should not be delayed unless a physiologic amputation under refrigeration can be performed. Then at a later date, when the patient's general condition is improved, the surgical amputation can be done with a more favorable prognosis for life.

PROGNOSIS

The natural clinical course of peripheral arterial embolism will depend upon the degree of spontaneous restoration of the collateral circulation, and, if adequate, there is the possibility of spontaneous recovery.

From the standpoint of survival of the extremity, the prognosis will depend upon several factors: the site of occlusion, degree of pathologic events initiated by the embolus, general condition of the patient, and promptness of treatment. In one series of cases, the incidence of actual gangrene in surviving patients was 34.9 per cent for the lower extremities and 7.8 per cent for the upper extremities.[3] The lower intrinsic vasoconstrictor activity, combined with the abundant main vessel collateral circulation in the upper extremity compared to the lower extremity, may account for the lower incidence of gangrene following emboli in the upper extremities.

From the standpoint of survival of the patient, the prognosis will depend essentially upon the condition of his heart and the possibility of further embolism to vital viscera. In the series mentioned above, there was a hospital mortality of approximately 50 per cent. The cause of death was either the cardiopathy or visceral emboli. Gangrene, when present, seemed to be an additional aggravating factor, both as a source of toxemia and as an operative risk if amputation was performed.

CONCLUSIONS

In determining a treatment regimen in each case of acute arterial occlusion, the patient must be considered as a whole, not just one limb or blood vessel. The patient's future welfare, indeed his life, may well depend upon early and adequate treatment. Accurate diagnosis, including localization of the site of occlusion, and careful selection of medical and/or surgical measures provide the best assurance of favorable results in treatment.

It cannot be overemphasized that constant attendance of a competent physician is required until the situation is relieved or the unfortunate outcome is definitely established. This is a duty that cannot be delegated to the house or nursing staff, since the welfare of his patient is the physician's individual responsibility.

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THE ISSUANCE BY PROFESSIONAL LICENSING BOARDS OF LICENSES ON THE BASIS OF RECIPROCITY OR ENDORSEMENT

Each year the number of licenses issued on the basis of reciprocity or endorsement by professional licensing boards increases. In the year 1954 some 384 licenses were issued to doctors of osteopathy on the basis of reciprocity or endorsement of a license held by the doctors in other states, while approximately 660 licenses were issued to doctors of osteopathy on the basis of written examinations. During the same year, medical licensing boards issued 8,202 licenses to doctors of medicine on the basis of reciprocity or endorsement, which exceeded by over 1,400 the number of licenses issued in the same year to doctors of medicine on the basis of a written examination. For both doctors of medicine and doctors of osteopathy, therefore, the issuance of licenses by these methods constitutes an important phase of the licensing system for physicians in this country.

In the actual administration of licensing laws by the boards which by statute are delegated the authority to administer such laws, the dictionary meanings of the terms "reciprocity" and "endorsement" have not been followed. The practical construction placed upon the words by the licensing boards has, however, now reached the stage where these two terms hold fairly well-accepted and recognized meanings in the administration of the laws.

The term "reciprocity" in licensing affairs has been the more commonly used of the two terms. It originally applied to situations where licensing boards agreed in writing to accept on a contract basis applications of license holders of other states upon presentation of their licenses, without requiring that such applicants take a written examination; persons possessing a license in the one state were accepted in the other state, generally with no issues raised except verification of the identity of the license holder and payment of the statutory fees. As a matter of administration today, most licensing boards do not have written agreements when they follow the reciprocity pattern, but rather as a matter of practice accept the licenses of certain other states as a basis for licensure in their own state. While some states grant licenses by reciprocity only to applicants from a state which grants equal recognition to applicants holding their licenses, other states will recognize licenses from a state which does not fully accept their licenses. In a strict sense, in this latter instance the states are not reciprocating, but the term has continued to be applied to such situations where boards do not individually investigate and approve the status of each out-of-state license presented.

The term "endorsement," on the other hand, has come to describe the administrative procedure of refusing to accept on its face any license presented by a license holder from another state solely upon the presentation of evidence of his identity and payment of the required fees. The term "endorsement" means that a state licensing board follows the policy of individual evaluation of applications for licensure upon the basis of the certificate of another state and individually investigates the qualifications of the applicant and the validity of the certificate presented. In such states there are no "reciprocity agreements," and no license holder has as a matter of law the statutory right to receive a license upon the presentation of the certificate of another state. Each application is decided upon the merit of the application alone, whether or not other individuals from the same state as the applicant under consideration have been licensed by the board in the past. In some states the terms "reciprocity" and "endorsement" are confused, and licensing boards actually follow the policy of endorsement, although they use the term "reciprocity"; in some instances the reverse is true. In a few states a policy of mixed reciprocity and endorsement is followed, making it difficult to describe accurately for the purposes of this article the administrative procedures followed by the licensing board.

Probably the most important factor involved by the increased recognition accorded licenses of other states by licensing boards has been the standardization of osteopathic and medical education in the United States. This standardization has been accomplished through the efforts of the Bureau of Professional Education and Colleges of the American Osteopathic Association and the Council on Medical Education and Hospitals of the American Medical Association. The adherence to the standards for professional education established by these two respective approving agencies has permitted state licensing boards to handle more easily their legally delegated powers. Nonetheless, there are provisions of state licensing laws which continue to complicate the licensing system insofar as reciprocity and endorsement are concerned; the most important of these provisions are enumerated below. The presence or absence of some or all of these provisions may complicate the ability of a state licensing board to accept either by reciprocity or endorsement a license from another state.

GENERAL STATUTORY PROVISIONS AFFECTING RECIPROCITY OR ENDORSEMENT

(a) *Preliminary Requirements.*—The laws of the various states are not uniform as to the provisions pertaining to the minimum age which an applicant must have reached, whether evidence of citizenship or a declaration of intent to become a citizen of the United States must be presented, the need for affidavits of persons licensed either in the state where the license was issued or in the state in which application is made, or whether proof of good moral character must be submitted. Some states have specific requirements pertaining to each of these items, while other state requirements may cover one or more. Whether the requirement of good moral character is or is not present specifically, it generally is an inherent part of the requirement of each state. Good moral character may be interpreted by the board to apply not only to professional practice but also to the private affairs of the applicant. The term can be given an extremely broad meaning.

(b) *An Osteopathic College Approved by the American Osteopathic Association.*—The adherence to the uniform educational standards established by the Bureau of Professional Education and Colleges of the American Osteopathic Association by the six osteopathic colleges has eased considerably the burden of state licensing boards. At present the minimum standards of the Bureau of Professional Education and Colleges require that all matriculants in osteopathic colleges have 3 years of training in a college or university accredited by a regional educational association, to be followed by the completion in a college of osteopathy of an osteopathic curriculum presented in a minimum of 4 standard academic years of at least 1,000 hours each, encompassing adequate and comprehensive instruction in all fields and areas of osteopathic medicine and surgery. In addition, the Bureau recommends the completion of an internship of 1 year in an osteopathic hospital approved by the Bureau of Hospitals of the American Osteopathic Association after completion of the professional college training; approximately 99 per cent of present graduates complete an approved internship prior to commencing professional practice. All licensing boards require that osteopathic applicants be graduates of an osteopathic college approved by the American Osteopathic Association.

(1) Preprofessional Training: State statutes vary from merely requiring a high school education to requiring 3 years' preprofessional college training. Most states, however, today require 2 years' preprofessional college training as the legal

standard. Inasmuch as all states now accept only the graduates of colleges approved by the Bureau of Professional Education and Colleges of the A.O.A., for practical purposes they require 3 years' preprofessional college training of all those now matriculating in osteopathic colleges for the first time.

(2) Professional Education: The standard educational requirement under state licensing laws is that an applicant has completed 4 years of training in an approved college of osteopathy. In some state laws it is specifically stated that such professional training must be approved by the American Osteopathic Association; in others this standard is adopted by board rule or regulation. No state requires more than 4 years of professional training, and in only a few states do archaic provisions still permit applicants to possess only 3 years of professional training. The requirement of A.O.A. approval amends by implication such archaic provisions and makes them of no real legal significance. Licensing boards, in construing provisions for reciprocity or endorsement, generally require that the board to which an application has been presented approved the school or college which the applicant attended at the date of issuance of the license in the other state. In other states the fact that the college or school is now approved, even though it may not have been at the date of issuance of the license in the other state, may be deemed sufficient.

(3) Internships: In 21 states applicants must present evidence of an internship; the exact legal requirements vary. For the most part, the internship must have been in a hospital approved for that purpose by the American Osteopathic Association, but in some states the hospital need be approved only by the licensing board. The Bureau of Hospitals is the agency which carries on the intern training and approval program of the American Osteopathic Association. In a few states the internship is described in detail while in others it is generally not so described. In some states the number of beds which an intern training hospital must have is definitely established either by law or regulation. Since the requirement of an approved internship is by and large of recent enactment, some states require only that an applicant who has graduated from an osteopathic college after a certain date present evidence of an approved internship, but others require that all applicants after a certain date present evidence of an approved internship.

(4) Postgraduate Training: In four states, doctors of osteopathy in order to qualify for an unlimited license to use operative surgery must present, in addition to the standard requirements of preprofessional and professional training, evidence of certain postgraduate training in surgery. Generally, these laws require 1 year's additional training in operative surgery, in addition to the 1 year's internship or its equivalent. In such states, however, an applicant generally is eligible for the issuance of a license to use drugs and minor operative surgery upon presentation of the standard educational and professional training requirements if he does not possess the specially required postgraduate training in surgery.

(c) *Equivalent Standards.*—In referring to the educational or professional standards with which an applicant must comply when presenting the license of another state, the reciprocity or endorsement provisions generally call for education and training "equivalent" to the educational and professional training requirements of the law which the licensing board administers. These provisions do not use a uniform term and may state that such education or training must be "equal to," "in no degree less than," "as high as," "of equal grade of," "practically equivalent to," or "substantially the same as" the standards of the state to which the license is presented. The interpretation placed upon these phrases by the licensing boards varies. In some states an extremely strict interpretation is placed upon the terms, and an applicant must meet with exactness the education standards of the state. In other instances states liberally construe these phrases so as to avoid any harsh or undue burden upon the applicant, while making sure that he does possess education and training equivalent to that of other license holders. It is difficult to advise accurately concerning the attitude of licensing boards as they vary from time to time. Some statutes provide that the standards of the two states concerned must have been substantially equivalent at the time the license in question was issued. In other states the absence of such a provision is interpreted to mean that the applicant must now present evidence which establishes that he possesses the same training and education presently required for the issuance of a license in the state in which he seeks licensure. In the latter case, changes in educational and professional standards in licensing laws are not taken into consideration.

(d) *Professional Experience.*—The laws of some states require that an applicant for licensure by reciprocity or endorsement possess certain professional experience or practice under the license that is presented. These provisions may require that the license shall have been in effect not less than a minimum number of years, or that if the license has been in effect for a certain minimum number of years the applicant has actually practiced under it for a certain number of these years. In some states there is no requirement that the license shall have been in effect any prescribed length of time or that the applicant shall have professional practice experience.

(e) *The Examination.*--Most states will not accept as the basis for issuance of a license by reciprocity or endorsement a license which was itself issued upon that basis and not upon the basis of a written examination. Thus it is said that a license may not be reciprocated or endorsed unless it was issued upon the basis of a written examination. The law may require that the examination be equivalent in scope to the examination in the state to which the license is presented. Some state laws also require that the license has been granted upon the basis of examination grades which are the same or similar to their own passing grades. Sometimes no mention is made as to either aspect of the examination; in such instances the matter of the examination is covered under the general provisions regarding equivalent education or training which are discussed in subparagraph (c) above. In regard to examination provisions, it is generally provided either by law or regulation that if an applicant fails the written examination of a licensing board, that board may not or will not issue that applicant a license by reciprocity or endorsement upon the basis of a license that such applicant holds in another state.

(f) *Scope of Practice.*—The laws of only a few states specifically state that the license presented must grant to the license holder the same scope of practice permitted under the license for which an application has been made. Despite this fact, it is the general rule that licensing boards will not issue on the basis of reciprocity or endorsement a license granting greater scope of practice than the license presented. In some states this rule or regulation has been adopted on the basis of a provision in the law that the educational and professional requirements and provisions of the licensing law of the state originally issuing the license are not "equivalent to" or "as high as" their own. Inasmuch as doctors of osteopathy now qualify for unlimited licensure under the laws of thirty-four states, the District of Columbia, and the Territory of Hawaii, the matter of scope of practice is not as important in reciprocity or endorsement licensing as it was in years gone by.

(g) *Medical Officers of the Armed Forces.*—Most state licensing laws provide that a license may be issued on the basis of a certificate presented evidencing either that the applicant has been commissioned as a medical officer of the United States Army, the United States Navy, or United States Public Health Service, or that the applicant has passed an examination for admission into such medical corps. In newer legislation the phrase, "the medical corps of the Armed Forces of the United States," may be used. Applicants who have passed such examinations may submit evidence to licensing boards, although provisions in regard to licensing by this method are not uniform, and in a few states are absent.

(h) *Discretionary Authority.*—The powers of boards vary considerably in relation to the degree of discretion possessed. In states where the laws provide for strict reciprocity the boards do not possess great "discretionary authority" as to the issuance or denial of a license. However, there is generally an element of "discretionary power," and the board may, if it believes the issuance of a license either by reciprocity or endorsement inadvisable, refuse to issue the license. By and large, the "discretionary authority" has been granted the board in order to permit it to refuse the issuance of a license to a person who is not of good moral character or who is of bad

reputation. In a few states the issuance of licenses is "entirely discretionary," and in such cases the issuance of a license is always a matter of endorsement.

(i) *The National Board of Examiners for Osteopathic Physicians and Surgeons.*—The laws of the states of Arizona, Colorado, Connecticut, Delaware, District of Columbia, Massachusetts, New Hampshire, New Mexico, Oregon, Rhode Island, South Dakota, Tennessee, Vermont, and West Virginia provide and the professional licensing boards accept certificates of the National Board of Examiners for Osteopathic Physicians and Surgeons in lieu of their own examinations. An applicant possessing the certificate of the National Board may thus be licensed in the state without written examination and without having presented the license of another state. In Arizona, Colorado, Connecticuf, District of Columbia, New Mexico, Oregon, Rhode Island, South Dakota, and Tennessee, the provisions of the state basic science laws must be complied with. In Connecticut, the National Board Certificate is accepted in lieu of the basic science examination also. Recognition accorded the National Board certificate is rapidly becoming a most important phase of interstate licensing.

(j) *Basic Science Laws.*—In states having basic science laws, the basic science requirements must be complied with before a professional licensing board will issue a license upon reciprocity or endorsement. The laws provide for interstate endorsement or reciprocity of basic science certificates in certain cases, with discrepancies similar to those found under the licensing laws discussed in this article. In a few instances, basic science boards will recognize examinations given by licensing boards, but generally the recognition accorded by reciprocity or endorsement under basic science laws must have been achieved under the basic science laws of another state. In a few states the basic science laws apply only to persons matriculating in a professional college after the enactment of the basic science law.

(k) *Fees.*—The fees under state licensing laws providing for reciprocity or endorsement vary from a minimal amount to a maximum of $200. In some states separate fees may be charged for the application and for the actual issuance of the certificate. Generally, all or a large part of the fee is returnable in the event the application is not accepted. In a few states an investigation fee is charged and is not returnable although the application is not granted. The exact amount of the fee is usually a matter of legislative enactment except where minimum and maximum fees are prescribed.

CONCLUSION

In the year 1954 licenses were issued to doctors of osteopathy on the basis of reciprocity or endorsement in thirty-six jurisdictions, including the Territory of Hawaii and the District of Columbia. In twenty-two areas laws were administered by independent osteopathic licensing boards and in fourteen by composite or medical licensing boards. The many different phases of state laws which create variances, and thus difficulties in describing the reciprocity or endorsement policies of state licensing boards, are noted above. In addition, the differences in attitudes of state licensing boards in regard to almost identical provisions also create problems. These attitudes may depend upon the cooperation between the medical and osteopathic professions in the states, the purposes of the boards in administering the laws, the number of physicians in the state and the need for more physicians, and the objects or purposes of applicants in seeking licenses in a particular state. It is always best to contact the secretary of the osteopathic association in a state prior to applying to the secretary of the state licensing or examining board. The association secretaries are acquainted with opportunities for practice and also are familiar with the general policies of the licensing boards.

The American Osteopathic Association publication, "Abstract of Laws and Regulations Governing the Practice of Osteopathy in the United States and Canada," contains the basic requirements and provisions in regard to the various provisions above commented upon and in brief attempts to define specifically reciprocity or endorsement policies. This publication may be secured by writing to the American Osteopathic Association, 212 East Ohio Street, Chicago 11, Illinois. It is revised from time to time, the latest revision being that of February, 1954.

Department of Public Relations

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Chairman
Washington

BILLS IN CONGRESS

Bills pending at the close of the 1st session of the 84th Congress on August 2, 1955, retain their status for consideration during the 2nd session which convenes January 3, 1956.

H.R. 483—Mr. Short, of Missouri. Amends the Army-Navy-Public Health Service Medical Officer Procurement Act of 1947, as amended, so as to provide for appointment of doctors of osteopathy in the Medical Corps of the Army, Navy, and Air Force. Passed House July 18, 1955.

H.R. 587—Mr. Teague, of Texas. Permits persons serving in the Armed Forces on January 31, 1955, to continue to accrue educational benefits under the Veterans' Readjustment Assistance Act of 1952 (Korean G. I. bill). Public Law 7, approved February 15, 1955.

H.R. 3005—Mr. Vinson, of Georgia. Extends the regular Draft Act to July 1, 1959, and extends the Doctor Draft Act to July 1, 1957, with age limit lowered to 46. Public Law 118, approved June 30, 1955.

H.R. 3322—Mr. McCormack, of Massachusetts. To improve the administration of the program for utilization of surplus property for educational and public health purposes. Public Law 61, approved June 3, 1955.

H.R. 5046—Mr. Fogarty, of Rhode Island. Makes appropriations for the Departments of Labor, and Health, Education, and Welfare, for the fiscal year ending June 30, 1956. Retains provision against discrimination against persons licensed to practice obstetrics under state law, in connection with administration of Title V of the Social Security Act. Contains appropriations for Hill-Burton program, and research and training grants under the National Institutes of Health, and the Vocational Rehabilitation program. Public Law 195, approved August 1, 1955.

H.R. 5139—Mr. Moss, of California. To readjust postal classification on educational and cultural materials.

H.R. 5152—Mr. Thompson, of New Jersey. Amends Internal Revenue Code of 1954 to provide a 30% credit against the individual income tax for amounts paid as tuition or fees to certain public and private institutions of higher education.

H.R. 5184—Mr. Boggs, of Louisiana. To grant an additional income tax exemption to a taxpayer supporting a dependent who is blind or otherwise permanently and totally disabled.

H.R. 5185—Mr. Boggs, of Louisiana. Amends Social Security Act to provide for payment of child's insurance benefits to certain individuals who are over the age of 18, but who are unable to engage in any regular employment by reason of permanent physical or mental disability.

H.R. 5263—Mr. Priest, of Tennessee. To authorize an additional Assistant Secretary in the Department of Health, Education, and Welfare.

H.R. 5328—Mr. Boggs, of Louisiana. Amends Social Security Act to reduce from 72 to 68 the age beyond which

deductions will not be made from benefits on account of outside earnings.

H.R. 5355—Mr. Wharton, of New York. Amends Social Security Act to repeal the limitation upon the amount of outside income which may be received by an individual while receiving benefits thereunder.

H.R. 5422—Mr. Elliott, of Alabama. To establish a program of financial aid to students in higher education.

H.R. 5431—Mr. Mack, of Illinois. Amends Social Security Act to extend OASI coverage to dentists.

H.R. 5605—Mr. Lipscomb, of California. Individual Retirement Act of 1955. Requires execution of certificate of total and permanent disability by a doctor of medicine only.

H.R. 5648—Mrs. Bolton, of Ohio. To authorize the Surgeon General of the Public Health Service to provide traineeships for graduate nurses.

H.R. 5668—Mr. Young, of Nevada. Amends Federal Employees' Compensation Act to provide that where an injured employee is required to submit to a physical examination he shall be furnished with a copy of the physician's report.

H.R. 5721—Mr. Huddleston, of Alabama. To provide for aid to the states in the fields of practical nursing and auxiliary hospital personnel services.

H.R. 5828—Mr. Thompson, of New Jersey. To establish an independent Office of Education in the Executive Branch of the Federal Government.

H.R. 5944—Mr. Ostertag, of New York. Amends Social Security Act to extend OASI coverage to lawyers.

H.R. 5946—Mr. Vinson, of Georgia. To extend expiration date of Doctor Draft Act.

H.R. 5969—Mr. Multer, of New York. To authorize the President, under certain conditions, to control, regulate, and allocate the use and distribution of medicinal substances for the purpose of protecting and preserving the health of the American people. Defines "medical substance" as any vaccine, serum, medicine, chemical, or other substance used for the prevention or treatment of disease.

H.R. 6044—Mr. Corbett, of Pennsylvania. Establishes an United States Commission on the Aging and Aged.

H.R. 6049—Mr. Kean, of New Jersey. Amends Social Security Act to extend OASI coverage to dentists.

H.R. 6050—Mr. Kean, of New Jersey. Amends Social Security Act to extend OASI coverage to lawyers.

H.R. 6051—Mr. Kean, of New Jersey. Amends Social Security Act to extend OASI coverage to persons engaged in the practice of medicine.

H.R. 6057—Mr. Vinson, of Georgia. To extend expiration date of Doctor Draft Act. Reported to House May 10, 1955, House Report No. 580. Substantially incorporated and enacted as a part of H.R. 3005.

H.R. 6151—Mr. Wickersham, of Oklahoma. Amends Social Security Act to extend OASI coverage to veterinarians.

H.R. 6165—Mrs. Rogers, of Massachusetts. Establishes United States Armed Forces Science Academy to train selected persons for service as scientists and engineers with the Armed Forces.

H.R. 6176—Mr. Powell, of New York. Provides a system of scholarships for college and graduated level study of scientific subjects, to be administered by the Commissioner of Education.

H.R. 6270—Mr. Ostertag, of New York. Amends Social Security Act to extend OASI coverage to dentists.

H.R. 6304—Mr. Poage, of Texas. College Students' Loan Act.

H.R. 6311—Mrs. Rogers, of Massachusetts. To authorize the appointment of doctors of chiropractic in the Department of Medicine and Surgery of the Veterans Administration.

H.R. 6334—Mr. O'Brien, of New York. Alaska Mental Health Act.

H.R. 6376—Mrs. Green, of Oregon. Alaska Mental Health Act. Reported to House July 25, 1955, House Report No. 1399.

H.R. 6406—Mr. Elliott, of Alabama. Medical Educational Facilities Construction Act of 1955. Defines "accredited medical school" as a school providing training leading to the degree of doctor of medicine.

H.R. 6415—Mr. Perkins, of Kentucky. Amends Social Security Act to provide disability insurance benefits for totally disabled individuals.

H.R. 6473—Mr. Chiperfield, of Illinois. Requests President to call World Conference on Cancer.

H.R. 6506—Mrs. Kelly, of New York. Amends Internal Revenue Code for 30% credit for amounts paid as tuition or fees to certain public or private institutions of higher education.

H.R. 6655—Mr. Reuss, of Wisconsin. Amends Social Security Act to provide disability insurance benefits for totally disabled individuals.

H.R. 6680—Mr. Burdick, of North Dakota. To prohibit experiments upon living dogs in the District of Columbia.

H.R. 6811—Mr. Johnson, of Wisconsin. Amends Social Security Act to extend OASI coverage to doctors of medicine, lawyers, dentists, and veterinarians.

H.R. 6837—Mr. Gubser, of California. To provide for a program of research and treatment of chronic alcoholism.

H.R. 6915—Mr. Fisher, of Texas. To establish a National Library of Medicine.

H.R. 6920—Mr. Jennings, of Virginia. Amends Social Security Act to provide that a fully insured individual who becomes totally and permanently disabled shall be deemed to have reached retirement age.

H.R. 7000—Mr. Brooks, of Louisiana. Reserve Forces Act of 1955. Public Law 305, approved August 9, 1955.

H.R. 7013—Mr. Fino, of New York. Individual Retirement Act of 1955. Requires execution of certificate of total and permanent disability by a doctor of medicine or osteopathy.

H.R. 7091—Mr. Fino, of New York. Amends Social Security Act to extend OASI coverage to lawyers.

H.R. 7126—Mr. Priest, of Tennessee. Poliomyelitis Vaccination Assistance Act of 1955.

H.R. 7225—Mr. Cooper, of Tennessee. Social Security Amendments of 1955. Provides for payment of monthly benefits at or after age 50 to workers who are totally and permanently disabled. Lowers retirement age for women from 65 to 62. Provides continuation of monthly benefits to children who become totally and permanently disabled before age 18. Extends OASI coverage to self-employed professional groups now excluded, excepting doctors of medicine. Passed House July 18, 1955.

H.R. 7241—Mr. Rees, of Kansas. Federal Employees' Group Health Insurance Act.

H.R. 7254—Mr. Huddleston, of Alabama. Establishes in the Department of Health, Education, and Welfare a Medical Advisory Committee on Alcoholism.

H.R. 7345—Mrs. Church, of Illinois. To provide for a Federal Advisory Council of Health in the Executive Office of the President.

H.R. 7346—Mrs. Church, of Illinois. Relating to hospital and medical care for American merchant seamen, for personnel of the Coast Guard, the Coast and Geodetic Survey, and the Public Health Service, and their dependents, and for federal employees, and for other purposes.

H.R. 7425—Mr. Ellsworth, of Oregon. Authorizes the disposal of surplus property for air medical service to remote areas.

H.R. 7600—Mr. Priest, of Tennessee. Authorizes the President to make the Commissioned Corps of the Public Health Service a military service in time of emergency involving the national defense.

H.R. 7602—Mr. Keogh, of New York. To provide deductions for gifts to nonprofit voluntary health insurance plans.

H.R. 7608—Mr. Priest, of Tennessee. Nursing Homes Mortgage Insurance Act.

H.R. 7621—Mr. Rains, of Alabama. Provides for grants to state health agencies to assist Hill-Burton hospitals in providing food for their patients.

H.R. 7792—Mr. Vinson, of Georgia. To provide medical care for dependents of members of the Armed Forces of the United States.

H.R. 7838—Mr. Davidson, of New York. Amends the Public Health Service Act to provide aid for survey and construction of psychiatric hospitals.

H.R. 7839—Mr. Davidson, of New York. To establish a program of scholarships for students in higher education.

H.R. 7841—Mrs. Green, of Oregon. To provide for the distribution to hospitals and other institutions of certain unclaimed or undeliverable publications.

H.R. 7846—Mr. Multer, of New York. To provide for loans to enable needy and scholastically qualified students to continue post-high-school education.

H.J. Res. 256—Mr. Priest, of Tennessee. Mental Health Study Act of 1955. Authorizes an appropriation of $1,250,000 for a 3-year program of research and study by nongovernmental organizations of the resources, methods, and practices of diagnosing, treating, caring for, and rehabilitating the mentally ill. Public Law 182, approved July 28, 1955.

H.J. Res. 278—Mr. Davidson, of New York. Provides that a gold medal be coined and presented to Dr. Jonas E. Salk in recognition of his achievement in the field of medicine in the discovery of a serum for the prevention of poliomyelitis. Public Law No. 297, approved August 9, 1955.

S. 182—Mr. Payne, of Maine. Requires premarital examination of all applicants for marriage licenses in the District of Columbia, and requires certification from physician licensed to practice medicine or osteopathy. Passed Senate June 24, 1955.

S. 849—Mr. Hill, of Alabama, for himself and Mr. Bridges, of New Hampshire. Medical Research Act of 1955.

Sec. 702. It is the purpose of this title to provide for grants-in-aid to accredited and nonprofit universities and schools of medicine, dentistry, and osteopathy, hospitals, laboratories, and other nonprofit institutions, engaged in or competent to engage in research, for the purpose of defraying the cost of construction of facilities, or the installation of equipment, needed for the conduct of research into the causes of and possible cures for crippling and killing diseases, including cancer, heart disease, poliomyelitis, nervous disorders, mental illness, arthritis and rheumatism, blindness, cerebral palsy, and muscular dystrophy.

Passed Senate July 18, 1955.

S. 1639—Mr. Long, of Louisiana. Amends Social Security Act to provide for payment of disability insurance benefits.

S. 1768—Mr. Magnuson, of Washington. To extend to persons entitled to receive medical care by or through the Veterans Administration the right to elect to receive chiropractic treatment.

S. 1778—Mr. Wiley, of Wisconsin. Amends Internal Revenue Code of 1954 to provide a 30% credit against the individual income tax for amounts paid as tuition or fees to certain public and private institutions of higher education.

S. 1779—Mr. Wiley, of Wisconsin. Amends Social Security Act to extend OASI coverage to lawyers.

S. 1830—Mr. Magnuson, of Washington. Amends Social Security Act to extend OASI coverage to lawyers.

S. 1840—Mr. Humphrey, of Minnesota. Amends Social Security Act to extend OASI coverage to dentists on a voluntary basis.

S. 1841—Mr. Humphrey, of Minnesota. Amends Social Security Act to extend OASI coverage to lawyers on a voluntary basis.

S. 1859—Mr. Humphrey, of Minnesota. Provides an emergency 5-year program of grants and scholarships for postgraduate education in the field of public health.

S. 2126—Mr. Sparkman, of Alabama. Housing Amendments of 1955. Broadens and liberalizes the College Housing Loan Program of the National Housing Act. Public Law No. 345, approved August 11, 1955.

S. 2279—Mr. Wiley, of Wisconsin. Services to the Aging and Aged Act.

S. 2299—Mr. Welker, of Idaho. To provide for broad research and training in the prevention, control, and cure of silicosis and other industrial diseases.

S. 2323—Mr. Kefauver, of Tennessee. To provide for the delayed reporting of births within the District of Columbia.

S. 2387—Mr. Humphrey, of Minnesota. Amends Social Security Act to provide disability insurance benefits for totally disabled individuals.

S. 2405—Mr. Smith, of New Jersey. To provide for a Federal Advisory Council of Health in the Executive Office of the President.

S. 2408—Mr. Smith, of New Jersey. To establish a National Library of Medicine.

S. 2425—Mr. Johnston, of South Carolina (for himself and Mr. Carlson, of Kansas). Federal Employees' Group Health Insurance Act.

S. 2501—Mr. Hill, of Alabama, and others. Poliomyelitis Vaccination Assistance Act of 1955. Appropriates $30 million for Federal allotments to the states. To provide children under 20 and expectant mothers an opportunity for polio vaccination. Public Law No. 377, approved August 12, 1955.

S. 2518—Mr. Jackson, of Washington. Alaska Mental Health Act.

S. 2587—Mr. Hill, of Alabama. Authorizes the President to make the Commissioned Corps of the Public Health Service a military service in time of emergency involving the national defense. Passed Senate July 30, 1955.

S. 2640—Mr. Clements, of Kentucky. To revive and extend the authority of the Housing and Home Finance Administrator to make loans or grants, or other payments for the construction of certain hospitals.

S. 2700—Mr. Flanders, of Vermont, and others. To provide deductions for gifts to nonprofit voluntary health insurance plans.

S. 2720—Mr. Russell, of Georgia (for himself and Mr. Saltonstall, of Massachusetts). To provide medical care for dependents of members of the Armed Forces of the United States.

S. 2751—Mr. Langer, of North Dakota. Amends Social Security Act to extend OASI coverage to lawyers and dentists on a voluntary basis.

S. 2753—Mr. Case, of New Jersey (for himself and Mr. Ives, of New York). District of Columbia Temporary Disability Insurance Act.

For other bills in Congress see THE JOURNAL, February, March, and April, 1955, issues.

SALK VACCINE

The osteopathic profession commends the National Foundation for Infantile Paralysis for the preparation and profession-wide distribution of the pamphlet entitled "Information for Physicians on the Salk Poliomyelitis Vaccine."

The A.O.A. participated in the Salk vaccine distribution conference with the Secretary of Health, Education, and Welfare, on April 22, 1955, and pledged the co-operation of the profession.

On August 12, 1955, the President approved the Poliomyelitis Vaccination Assistance Act of 1955, Public Law No. 377. The law authorizes $30 million for Federal allotments to the states, under state plans approved by the Surgeon General of the Public Health Service. Twenty-five million dollars are for purchase of vaccine and $5 million are for planning and conducting programs or for the purchase of vaccine. The funds are to be used by February 15, 1956. The law restricts use of vaccine purchased with these funds to pregnant women and children under 20.

The Act is separate and distinct from the voluntary plan for allocation of the vaccine during the period of short supply, which went into effect on July 31, 1955, and under which the current priority group is made up of children 5 through 9 years of age. Under the voluntary allocation plan, the Public Health Service allocates the supply of vaccine and the states have the responsibility for distribution of the vaccine through both commercial and public agency channels. All the states have designated officials to handle the problems of equitable intrastate distribution. These state officials determine what proportion of the share of their state is to go to public agencies, such as local health departments, and what amount will be distributed by the manufacturers through normal drug channels for use by private physicians.

Congress appropriated $300,000 to cover the cost of forty-eight special investigators of the Food and Drug

Administration to prevent possible "black market" distribution of the vaccine in the states. Check-ups by these investigators will be considered complete in regard to any particular lot of vaccine when FDA has a record indicating its total distribution into legal channels; that is, when it has determined that the vaccine is in the hands of a physician, a hospital, a state or local health department, or other authorized person or agency.

Following is the text of the Poliomyelitis Vaccination Assistance Act of 1955:

PUBLIC LAW 377—84TH CONGRESS
CHAPTER 863—1ST SESSION
S. 2501

AN ACT

To provide grants to assist States to meet the cost of poliomyelitis vaccination programs, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Poliomyelitis Vaccination Assistance Act of 1955."

AUTHORIZATION OF APPROPRIATION

SEC. 2. There is hereby authorized to be appropriated, to remain available until February 15, 1956, such sums as may be necessary for making payments to States which have submitted, and had approved by the Surgeon General, applications for grants under this Act.

ALLOTMENTS TO STATES

SEC. 3. (a) From the sums appropriated pursuant to section 2, the Surgeon General shall allot to each State which has an application approved pursuant to section 4—

(1) an amount equal to 33⅓ per centum of the number of unvaccinated eligible persons in such State multiplied by the product of (A) the cost of the poliomyelitis vaccine per eligible person, and (B) the State's allotment percentage; and

(2) an additional amount equal to 20 per centum of allotments available to the State under paragraph (1) of this subsection, such additional amount to be available for expenditure only in accordance with the provisions of section 6 (b) of this Act.

(b) A State's allotment percentage shall be equal to the per capita income of the United States divided by the per capita income of the State. Such percentage shall be determined by the Surgeon General on the basis of information furnished by the Department of Commerce; except that the allotment percentage for Hawaii shall be 100 per centum and for Alaska, Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Canal Zone shall be equal to the allotment percentage determined above for the one of the forty-eight States which has the lowest per capita income.

STATE APPLICATIONS FOR FUNDS

SEC. 4. The Surgeon General shall approve the application of any State for payments under this Act if such application—

(a) provides that all poliomyelitis vaccine purchased with funds paid to the State under this Act shall be used for the vaccination of eligible persons pursuant to a plan which sets forth the method or methods by which vaccinations will be made available within the State (through public agencies, approved non-profit organizations, private physicians, or otherwise): *Provided,* That the Surgeon General may, for the purpose of assuring the most effective and equitable distribution and use of available supplies of poliomyelitis vaccine, establish categories of eligible persons to be accorded priority in receiving an opportunity for vaccination against poliomyelitis; and, except to the extent that the Surgeon General authorizes deviations from such categories, during any period in which any categories have been so established, all vaccine acquired by any State through assistance provided pursuant to this Act shall be made available only to persons within any such category;

(b) provides that in poliomyelitis vaccination programs conducted by public agencies in the State no means test or other discrimination based on financial ability of individuals will be imposed to limit the eligibility of persons to receive vaccination against poliomyelitis;

(c) provides for administration or supervision of administration of the plan included in the application by a single State agency;

(d) provides that the State agency will make such reports, in such form and containing such information, as the Surgeon General may from time to time reasonably require to carry out his functions under this Act, and comply with such provisions as he may from time to time find necessary to assure the correctness and verification of such reports; and

(e) provides such accounting, budgeting, and other fiscal methods and procedures as are necessary for the proper and efficient administration of the plan.

PAYMENTS TO STATES

SEC. 5. The Surgeon General shall from time to time estimate the amount to be paid to each State under the provisions of this Act for any period, and shall pay such amount to such State, from the allotment available therefor, reduced or increased, as the case may be, by any sum (not previously adjusted under this section) by which he finds that his estimate of the amount to be paid to the State for any prior period under this Act was greater or less than the amount which should have been paid to the State for such prior period under this Act. Such payments shall be made in such installments as the Surgeon General may determine.

USE OF FUNDS PAID TO STATES

SEC. 6. (a) Funds paid to a State from that part of its allotment computed in accordance with section 3 (a) (1) of this Act may be used solely for the purchase, prior to February 15, 1956, of the poliomyelitis vaccine for use in carrying out the plan set forth in the application of such State approved pursuant to section 4.

(b) Funds paid to a State from that part of its allotment computed in accordance with section 3 (a) (2) of this Act may be used prior to February 15, 1956, only for planning poliomyelitis vaccination programs within the State and for conducting such programs through public agencies in the State in accordance with the plan set forth in the application of such State approved pursuant to section 4; except that any part of such funds determined by the State to be in excess of the amount necessary for such purposes may be used for the purposes specified in subsection (a) of this section.

(c) Nothing in this Act shall limit funds granted to a State under other provisions of Federal legislation from being available to purchase poliomyelitis vaccine or to plan and conduct poliomyelitis vaccination programs in accordance with approved State plans applicable to such grants.

FURNISHING OF VACCINE BY SURGEON GENERAL

SEC. 7. At the request of any State the Surgeon General may use all or any portion of the allotment of such State under this Act for the purchase, in accordance with State specifications, of the poliomyelitis vaccine, to be furnished to the State in lieu of such State's allotment (or such portion thereof). Vaccine so furnished shall be subject to the same requirements as to use as vaccine purchased from payments to States pursuant to this Act.

DIVERSION OF FEDERAL FUNDS

SEC. 8. Whenever the Surgeon General, after reasonable notice and opportunity for hearing to the State agency administering or supervising the administration of the plan included in the application of such State approved under section 4, finds that—

(a) such State agency is not complying substantially with the provisions of this Act or the terms and conditions of its approved application; or

(b) any funds paid to such State or supplies of vaccine furnished to it under this Act have been diverted from the purposes for which paid or furnished;

the Surgeon General shall notify such State agency that no further payments will be made (or no further supplies of vaccine will be furnished) to the State under this Act until he is satisfied that there is no longer any failure to comply or the diversion has been corrected or, if compliance or correction is impossible, until such State agency repays or arranges for the repayment of Federal funds which have been diverted or improperly expended (or for repayment of the cost of the vaccine which has been diverted).

EXERCISE OF FUNCTIONS

SEC. 9. The functions granted to the Surgeon General under this Act shall be exercised under the supervision and direction of the Secretary of Health, Education, and Welfare.

DEFINITIONS

SEC. 10. For purposes of this Act—

(a) The term "Surgeon General" means the Surgeon General of the Public Health Service.

(b) (1) The term "eligible person" means any individual who has not attained the age of twenty years and any expectant mother.

(2) The number of eligible persons shall be determined by the Surgeon General, as of June 30, 1955, on the basis of estimates developed after consideration of the latest information furnished by the Department of Commerce or any other department or agency of the United States.

(3) The number of unvaccinated eligible persons means the number of eligible persons, reduced by (A) the number who were vaccinated against poliomyelitis during 1954, and (B) two-thirds of the number who the Surgeon General estimates will receive vaccination under the current program of the National Foundation for Infantile Paralysis.

(c) The term "State" includes Alaska, Hawaii, Puerto Rico, the Virgin Islands, Guam, American Samoa, the Canal Zone, and the District of Columbia.

(d) The cost of the poliomyelitis vaccine shall be determined by the Surgeon General on the basis of information available to him; and such cost may be determined from time to time or as of a specified date and may be determined to be a single figure for all States or varied in accordance with actual cost.

(e) The term "approved nonprofit organization" means, in the case of any State, a nonprofit organization approved by the State agency responsible for administration or supervision of administration of the State plan.

Approved August 12, 1955.

Current Literature

EFFECT OF GONADECTOMY ON DENTAL CARIES: REVIEW OF THE LITERATURE

The observations of various investigators on the relationship between the endocrine system and salivary gland function and dental caries are reviewed by Lloyd A. Delman, B.A., in *The Journal of the American Dental Association,* August, 1955.

Available information fails as yet to explain adequately how endocrine function might affect dental caries. Most of the literature on this relationship has been concerned with studies of dental caries in gonadectomized animals, but only a few studies have branched out into the histologic and metabolic aspects of salivary gland function after gonadectomy. More studies now appear to be directed toward an understanding of the physiology of the relationship between the endocrine system and the salivary glands.

The observations and conclusions of a number of authors who studied various laboratory animals are cited briefly, and the over-all picture is summarized. Although several of the studies reported statistically insignificant results, some workers noted that the incidence of caries was reduced after gonadectomy. This would suggest that the gonads have some systemic influence on the development of dental caries. In one study, exogenous estrogens were found to increase the incidence of dental caries in albino rats, whether they were intact or had had the gonads removed. Estrogens are thought to have the capacity of inhibiting thyroid activity. It would then follow that if the thyroid gland does in any way affect the flow of saliva, estrogens might decrease that flow, thereby explaining the increased incidence of dental caries in rats receiving exogenous estrogens.

USE OF DIOCTYL SODIUM SULFOSUCCINATE (AEROSOL O.T.) FOR SEVERE CONSTIPATION

Treatment of severe fecal impaction and milder forms of constipation with dioctyl sodium sulfosuccinate (Aerosol O.T.) is reported by James L. Wilson, M.D., and David G. Dickinson, M.D., in *The Journal of the American Medical Association,* May 28, 1955.

Dioctyl sodium sulfosuccinate, one of the earliest synthetic wetting agents, counteracts constipation by making it possible for water or mineral oil to penetrate and to soften hard fecal masses. Its use for the past 12 years in hundreds of patients has created no untoward reactions (bowel irritation or interference with bowel function) nor other ill effects, even after prolonged use. Men who have handled the drug for years have experienced no abnormal reactions to it. Even infants, given as much as 50 mg. per kilogram body weight in one dose, have experienced no distress.

Because of its properties, dioctyl sodium sulfosuccinate was expected to have some effect on the absorption of foodstuffs from the intestine. The authors therefore made some preliminary food absorption studies on infants, plotting the amino acid and vitamin A absorption curves. The results were inconsistent in these studies, as well as in others conducted among patients with celiac disease, cystic fibrosis of the pancreas, and other disorders. This agent was found to have no dependable effect either in improving or inhibiting food absorption from the intestine.

Dioctyl sodium sulfosuccinate is marketed in solid pellets as well as in 10 per cent aqueous solution. Diluting the commercial preparation with distilled water, the authors used a 1 per cent solution in their patients. Despite the bitterness of the concentrated product, it can be added to infant formulas, taken with fruit juice, with mineral oil, or alone. Its most dramatic effect has been on impacted feces, particularly in children with some form of megacolon. Even after obstructive symptoms have made their appearance, dioctyl sodium sulfosuccinate, given orally and by enema, has resulted in spontaneous evacuation of fecal masses too hard and too large to be removed digitally. As an adjunct, it has been valuable in treating megacolon secondary to congenital absence or dysfunction of part of Auerbach's plexus and for preoperative and postoperative megacolon. The 1 per cent aqueous solution is given in 2 cc. doses three times a day by mouth, in milk or juice; enemas of 30 to 60 cc. mineral oil or sometimes sodium chloride, combined with 5 cc. of the 1 per cent solution, may also be given.

Young babies with hard lumpy feces have benefited from treatment twice a day with 15 drops of dioctyl sodium sulfosuccinate in 1 per cent solution, taken with their formulas and without added mineral oil. Infants with postoperative anal atresia, given the agent by mouth, do not tend to become constipated.

Muscularly incapacitated or immobilized patients (as in poliomyelitis) and severely paralyzed persons (like patients cared for in respirators) ordinarily are troubled with severe constipation. A 2-cc. dose of 1 per cent solution of dioctyl sulfosuccinate for adults or half that amount for children, with magnesium hydroxide occasionally added, will usually afford relief. For severe constipation, an enema of sodium chloride solution with dioctyl sodium sulfosuccinate added is extremely helpful. Fecal retention in the newly hospitalized patient is treated with oil retention enemas with 5 cc. of 1 per cent dioctyl sulfosuccinate in 90 cc. mineral oil, thereby obviating the use of other cathartics.

AN EVALUATION OF THE PRACTICE OF ROUTINE POSTOPERATIVE NASOGASTRIC SUCTION

The use of nasogastric suction after elective, major abdominal surgery is evaluated by Gilbert G. Eade, M.D., *et al.,* in *Surgery, Gynecology and Obstetrics,* September, 1955.

Such an evaluation was deemed important since suction tubes often cause complications that are serious, since so much disagreement exists among surgeons on both the need and the duration of postoperative intubation, since uncomplicated early intestinal distention is rare, and since there were no adverse effects in 130 of 143 consecutive major abdominal procedures which were managed without postoperative intubation.

Among the more serious complications of intestinal intubation listed in the literature are severe injury to nasal passages; laryngeal injury leading to ulceration, cord paralysis, or stenosis; esophageal injury, leading to esophagitis, ulceration, perforation, stenosis, or ruptured varices; perforation of the stomach or intestine; obstruction from knotting, intussusception over the tube; balloon distention; complications from mercury spillage; and, finally, severe disturbances in fluid balance.

Laryngeal and esophageal injuries almost always create long-term problems requiring multiple operation or dilatation and causing permanent injuries. Eight deaths directly related to complications following intubation are reported in the literature. Rapid depletion of electrolytes can cause innumerable problems, even death, in sick or postoperative patients, and suction always removes valuable fluid and electrolytes.

Suction has been maintained postoperatively to treat gastric dilatation, gastric distention, and to avoid tension on suture lines; to permit evaluation of postoperative bleeding at the anastomosis; to treat prolonged nausea and vomiting; to determine safety of oral feeding by studying the efficiency of stomach emptying; and to prevent gastrointestinal distention.

Intubation is, of course, necessary for distention, before, during, or after surgery. It is also needed when there is an irritative surgical lesion associated with prolonged ileus. It is needed in diagnosis. However, purely prophylactic intubation is unwarranted, hazardous, and uncomfortable.

Since early postoperative intestinal distention is minimal, suction is usually unnecessary for this indication. Postoperatve distention results partly from air that enters by way of the

esophagus. It may be swallowed, but usually enters during inspiration against a closed glottis with the pharyngoesophageal junction relaxed. It accumulates in the upper intestine and stomach and is usually eructated on standing erect. If the tube is not resting high enough in the intestine, it will fail to remove the air and may even increase distention by holding the pharyngoesophageal junction open. Significant postoperative distention from fluid or gas is uncommon, but when it occurs a tube is put down at that time.

In this series, the 130 patients not treated by intubation were instructed to swallow nothing and to take nothing by mouth until flatus had been passed postoperatively. In 13 patients, suction was used for specific indications found on operation. There were no deaths or adverse effects among the 130.

Suction was used seven times after 45 subtotal gastric resections; four times, for indications found during surgery, in 57 cholecystectomies with choledochostomy; only once in 23 total hysterctomies for relief of cramps and distention of undetermined origin; 19 colectomies, including abdominal perineal resection, were performed without postoperative intubation and without difficulties.

By eliminating suction, one can facilitate nursing care, eliminate concern over patency of the tube, simplify maintenance of fluid and electrolyte balance, and reduce discomfort. Most patients will cooperate when advised that intubation may be obviated if they swallow nothing until flatus is passed.

OFFICE DIAGNOSIS AND TREATMENT OF ESSENTIAL HYPERLIPEMIA

Clinical signs and symptoms, simple tests, and urgent specific therapy in essential hyperlipemia are discussed by Alfred Soffer, M.D., in *Postgraduate Medicine,* August, 1955.

Because essential hyperlipema is so often associated with such symptoms of premature atherosclerosis as intermittent claudication and angina pectoris, it often initially comes to the attention of the general practitioner. Treatment is urgent.

Essential (idiopathic) hyperlipemia is recognizable by the extreme milkiness of serum after the specimen has stood for a while. Abnormally large amounts of neutral fat are what give the serum its milky appearance. Serum levels of cholesterol, cholesterol esters, and phospholipids need not be elevated. If there is hyperlipemia but no diabetes mellitus, lipid nephrosis, nephrotic glomerulonephritis, thrombosis of renal veins, pancreatitis, hepatic disease, obstructive jaundice, poisoning, anemias, anoxemia, von Gierke's disease, cachexia, Niemann-Pick disease, induced myxedema, or pregnancy, the disease is classified as essential hyperlipemia.

Clinical recognition is based on the milky or salmon-pink appearance of both the arterial and the venous vessels of the fundus of the eye (lipemia retinalis); on the inflammatory yellowish skin xanthomas that appear chiefly on extensor surfaces but may appear on other areas of the body; these appear and disappear, and when the characteristic rosy halo disappears, the xanthomas resemble the secondary lesions of diabetes mellitus, chronic pancreatitis, lipid nephrosis, von Gierke's disease, biliary obstruction, and familial hypercholesteremia.

Essential hyperlipemia should be suspected in patients who are not of atherosclerotic age but who have signs and symptoms of cardiac or peripheral vascular difficulties. Parents or siblings often have serum hyperlipemia or give histories of vascular disease. Essential hyperlipemia in children is nearly always manifested by hepatosplenomegaly. About half of the adults with this disease also have enlarged livers or spleens. Episodes of vomiting and acute abdominal pain, tenderness, and even rigidity — usually in the upper abdomen but often in other quadrants—are not uncommon.

Diagnosis is certain when serum taken in a postabsorptive state contains an abnormally high concentration of neutral fat, if no diseases associated with secondary hyperlipemia exist. A tentative diagnosis can be reached without laboratory facilities by allowing a blood specimen to stand for a few hours or by centrifuging a specimen in a hematocrit tube. The serum then looks opalescent. Gross opalescence is apparent only in more severe illness. Urinalysis would effectively rule out hyperlipemia secondary either to nephrosis or to diabetes mellitus.

The treatment is dietary rather than medicinal. A low fat diet is mandatory.

Only transitory—though profound—effects on serum neutral fat content have been noted even after prolonged use of heparin intravenously in seven patients with essential hyperlipemia. Its widespread clinical use would seem premature, and its use in abdominal crises is yet to be evaluated.

THE IMPORTANCE OF TECHNIC IN CHOLECYSTECTOMY

The status of cholecystectomy, which constitutes 90 per cent of all biliary tract operations in this country and which therefore is probably the technic performed most often by the greatest number of surgeons, is critically reviewed by Frank Glenn, M.D., in *Surgery, Gynecology and Obstetrics,* August, 1955.

The need for such a survey was pointed up by the need for treating new, severe, persistent, or recurrent gallbladder symptoms in patients already operated on for gallstones. The commonest causes for apparent initial surgical failure are common duct injury and residual cystic duct remnant, both the result of technical errors. Injuries to the common duct impair the health and reduce life expectancy far more than stones in the biliary tract, and reconstructive surgery rarely reverses the picture.

The common duct is injured when it is mistaken for the cystic duct and is divided before the junction of the two ducts has been adequately established; when bleeding obstructs the operative field following injury to the cystic or the hepatic artery, blind clamping and ligation of unidentified structures leads to complete or partial obliteration of the common duct. Rarely is the common duct injured if the gallbladder is removed after it is dissected from the fundus toward the cystic duct. About half of the injuries reviewed occurred in the hands of the "casual" gallbladder surgeon; little reason could be found for erroneous identification of the common duct by the others.

Consensus is that persons performing cholecystectomy should have an awareness of the seriousness of common duct injury and should familiarize themselves with the normal anatomy and congenital anomalies of the biliary tract and its vascular system. Plenty of time should be allowed for deliberate dissection and unquestionable identification of all structures. Incisions should be generous and provide adequate and easy exposure. No structure should be divided until it has been identified beyond question.

The gallbladder should first be dissected from its bed; the cystic duct should then be divided after its junction with the common duct is identified by incision of the peritoneum, parallel to the common duct, in the apparent area of its junction with the cystic duct; by identifying the cystic duct and dissecting it enough to enable passing a silk ligature around it; by extending the dissection cephalad and laterally toward the wall of the gallbladder to expose the cystic artery, which is dissected free for a distance long enough to permit passing a silk ligature around it, set by one knot, just before it branches within the wall of the gallbladder; by incising the peritoneum over the gallbladder, 1 cm. from its junction with the liver and dissecting the gallbladder from its liver bed from the fundus toward the cystic duct; by dividing the branches of the cystic artery, on approaching the ampulla of the gallbladder, as they enter the wall of the gallbladder and permanently fixing the cystic artery, and by dissecting the cystic duct down to its true junction with the common duct and dividing ½ cm. from it.

The most common error is clamping and dividing what is believed to be the cystic duct but what actually is the common duct or the right hepatic artery. When the gallbladder has been dissected from its bed with the cystic duct intact, it is easy to follow it to its true junction with the common duct, since visualization of the entire cystic duct is better than when the gallbladder is dissected in its fixed location.

It is true that the well-trained and careful surgeon may remove the gallbladder completely and safely, regardless of his

method. To be sure, the surgeon is more important than the method. But fewer accidents would result if the gallbladder were first freed from its bed, and the true junction of the cystic and common ducts were demonstrated before the cystic duct is divided.

The cystic duct should be secured and divided within 5 mm. of its junction with the common duct. By flush ligation with an indurated common duct wall, it may be sheared off, allowing bile to escape or requiring wall sutures that may diminish the lumen of the common duct. If, on the other hand, more than a few millimeters of the cystic duct remain, the remnant may enlarge and provide a site for future gallstones, giving rise to symptoms like those arising from a gallbladder that contains stones. Then, inflammation may set in.

The common duct can usually be visualized after removal of the gallbladder by use of Cholografin—unless liver function is impaired or jaundice exists. This medium has been used successfully at The New York Hospital-Cornell Medical Center on more than 350 patients, 121 of whom had persistent or recurring symptoms after cholecystectomy. Of that group, 100 were women, and ages ranged from 23 to 29. In 86.8 per cent the common duct was visualized satisfactorily. Abnormalities of the biliary duct were found in 40, 18 of whom had cystic duct remnant, 11 with calculi, and 11 with adhesive bands and strictures. In 20, all or part of the ductal system was dilated. No ductal abnormality was found in 15 others. Additional studies of 26 patients in this series disclosed duodenal ulcer, hiatus hernia, pancreatitis, or renal disease to which symptoms could be wholly or partly attributed. Intravenous cholangiography is therefore a valuable aid in identifying remnants of the cystic duct.

THE USE OF CHLORPROMAZINE IN THE MANAGEMENT OF PATIENTS WITH HEAD INJURY

The use of chlorpromazine orally or intramuscularly for the treatment of disturbed patients with head injuries with or without acute alcoholism is reviewed by James G. Shea, M.D., *et al.*, in *Archives of Internal Medicine*, August, 1955.

In this series of twelve patients, chlorpromazine was often used to control excitement effectively enough to permit completion of diagnostic studies and clinical observations. An ideal sedative for such patients would reduce excitement without causing stupor or masking neurologic damage. It should relieve pain or potentiate the effect of the analgesics used without adversely affecting respiration or aggravating the effects of the injuries or causing undesirable side effects.

Chlorpromazine (50 to 100 mg.) effectively reduced excitement, even excitement resulting from head injury uncomplicated by alcoholism, enough to permit lumbar puncture and x-ray studies. It facilitated nursing care, intravenous therapy, oxygen administration, and catheterization. Because chlorpromazine is selective in its effect on areas of the central nervous system, aroused patients are essentially as alert after taking the drug as they were before. When evidence of cortical depression appears, chlorpromazine is withdrawn and the causes for the depression are sought. Only two of the twelve patients had paradoxic responses to the drug.

To determine whether chlorpromazine would mask or distort reflexes, a separate study of the effect of two oral doses of 50 mg., administered 1 hour apart, was made on four ambulatory patients convalescing from tuberculosis. Gag, cough, corneal, and tendon reflexes and muscle proprioception were observed immediately before the first dose and 1 hour after each dose. None of the reflexes tested was impaired or exaggerated even after the second dose. Since chlorpromazine is known to potentiate the action of many other analgesics or cortical depressants, doses of opium alkaloids, synthetic narcotics, and aliphatic hypnotics can be reduced by half if they are administered along with chlorpromazine. Of the twelve patients studied, only one required a mild analgesic concomitantly.

No evidence of respiratory depression was noted either in this series or in any of the more than 500 other patients observed by the authors. Neither cerebral edema nor intracranial bleeding is aggravated. One common side-effect is the tendency the drug has to produce hypotension and tachycardia. When intracranial pressure is increased by acute cerebral edema or intracranial bleeding, increased blood pressure enhances the adequacy of the cerebral circulation. In such cases, chlorpromazine, because it does reduce the blood pressure, would theoretically be harmful. Fortunately, its effect on the blood pressure is slight to moderate, and adverse reactions are ordinarily unlikely.

The optimal initial dose ranges from 25 to 50 mg., depending on the patient's degree of hyperactivity. Extreme excitement might occasionally require 100 mg. Usually, deep intramuscular injection is preferred. If no significant effect is noted in 30 minutes, a second dose may be given within the hour. The effect of a single dose usually lasts for 4 to 6 hours.

MILONTIN IN THE TREATMENT OF EPILEPSY

The results of treating petit mal epilepsy in 200 patients for approximately 5 years with the help of Milontin are reviewed by Frederic T. Zimmerman, M.D., in the *New York State Journal of Medicine*, August 15, 1955.

Milontin, the succinimide with the simplest molecular structure, had proved the most effective anticonvulsant with the lowest degree of toxicity. After preliminary toxicity studies in dogs, rats, and mice, clinical tests showed that Milontin caused no blood dyscrasias in patients treated with it.

For purposes of this study, petit mal refers to pyknolepsy or pure petit mal (temporary loss of consciousness but without loss of postural tone nor concomitant motor phenomena); to mixed petit mal (temporary loss of consciousness and such minor motor phenomena as clonic arm movements); and petit mal, combined with other types of seizures. In this series, 104 patients had both petit mal and grand mal attacks; 84 had pure petit mal and 8 had mixed petit mal seizures; and 4 had petit mal and psychomotor attacks. Only the results on petit mal seizures are reported. Most of the patients with this type of seizure being children, information on the frequency of attacks rested on parents' reports. Each parent recorded the number of attacks per day on a specially prepared calendar, from which data were then periodically transferred into the clinic records.

Milontin was found to control the petit mal seizures effectively, with few toxic side-reactions. The average daily dose used was 2.7 grams. Complete freedom from attacks for at least 4 consecutive weeks (complete control) was experienced by 22 per cent of the patients; 80 to 99 per cent reduction in the number of seizures (practical control) was experienced by 29 per cent; 5 to 79 per cent reduction (partial control) was experienced by 32 per cent; and 2 per cent experienced a greater number of attacks per week.

The average daily dose (2.7 grams) was administered in 0.3-gram capsules, nine of which were given each day; however, the dosage range was broad, and as many as 14 to 15 capsules a day could be given safely.

Little relation was found between age and dosage, but medication was begun at 0.3 gram, slowly increasing dosage by 1 or 2 capsules per week until the optimal level was reached.

Toxic reactions included nausea in four patients, loss of appetite in three, dizziness in four, drowsiness in three; and one each experienced stomach pains, itching, skin reddening, vomiting, photophobia, or hematuria. However, no serious side-effects were noted even when the average daily dosage was continued for an average of 21 weeks. Occasionally red blood cells will be observed in the urine of the epileptic patient, regardless of what medication he takes, but this reaction does not seem to be directly related to the drug that is being taken. Some tendency toward irritation of the urinary system may sometimes arise after prolonged treatment with a variety of drugs. One patient who was taking 6 grams of Milontin each day did experience frank hematuria, but this quickly cleared when the dosage was reduced. No evidence of permanent damage to the urinary system was found on follow-up.

This study would indicate the definite advantage of Milontin over other drugs tested because of its mildness and relative freedom from side-effects.

Book Notices

MEDICAL TREATMENT OF MENTAL DISEASE. The Toxic and Organic Basis of Psychiatry. By Daniel J. McCarthy, A.B., M.D., LL.D., Consulting Neurologist, Philadelphia General and Norristown State Hospitals; Associate Trustee, University of Pennsylvania; formerly Medical Director of Fairmount Farm and Roseneath Farm, and the Neuropsychiatric Service, St. Agnes Hospital, Philadelphia, and Professor of Medical Jurisprudence, University of Pennsylvania; and Kenneth M. Corrin, B.S., M.D., Neuropsychiatrist, Wilmington General Hospital, and Consulting Psychiatrist, St. Francis Hospital, Wilmington, Delaware; formerly Clinical Director, Wernersville State Hospital, and member, Psychiatric Staff, Philadelphia General and Jefferson Hospitals, and Instructor in Psychiatry, Jefferson Medical College. Cloth. Pp. 653, with illustrations. $12.00. J. B. Lippincott Co., East Washington Square, Philadelphia 5, 1955.

In a sense this book represents the dominant practice of psychiatry in this country, a physical approach to the treatment of mental illness. By far the largest body of psychiatrists are organicists or, using the more modern term, biologic psychiatrists.

The authors have done well and have achieved their purpose, stated in the opening chapter, that they will "as far as possible keep free from purely psychological and philosophical conceptions that are not based on proved and scientific principles, and will present the subject in such a way that any well-trained scientific student can understand it and put it into practice." They " . . . conceive the brain to be the organ of thought . . ." and they feel that only upon an organic basis will psychiatry advance as a science.

The book begins with a discussion of the physical basis of psychiatry, followed by chapters on the causes of mental disorders, the occurence of mental disorders, the examination of the patient, and personality.

The clinical entities are divided into three groups: Mental Disorders of Known Etiology and Pathology; Mental Disorders of Unknown Etiology but Known Symptomatology and Pathology; and Mental Disorders of Unknown Etiology, Mechanism or Pathology, but with Consistent and Uniform Symptomatology. A further subdivision is made of disorders not psychotic in character: mental deficiencies, convulsive states, psychopathic personalities, and psychophysiologic states. Then follows a section on basic treatment methods. Fifty-three pages are devoted to psychotherapeutic measures, fifteen of which are given over to a description of mental processes, such as attention, delusions, fear, consciousness, et cetera. The psychotherapy discussed is really a consideration of the doctor-patient relationship. In this connection, however, the authors have handled the subject exceptionally well. This chapter alone is worth the price of the book; it is a real contribution. Finally there is a chapter on forensic psychiatry, bringing the book up to date, for psychiatry today has much to do with legal procedures.

This is a book for the general physician as well as for the psychiatrist who wishes a quick reference work. It is written in an easy style, and the technics are described in detail. The material is authoritative and well supported by references.

This reviewer feels that there is perhaps too much adulation of Weir Mitchell at the expense of modern psychodynamic procedures, but this does not seriously detract from the book, which is recommended as being most useful.

THOMAS J. MEYERS, Ph.D., D.O., F.A.C.N.

PEDIATRIC DIAGNOSIS. By Morris Green, M.D., Assistant Professor of Pediatrics, Yale University School of Medicine; and Julius B. Richmond, M.D., Professor and Chairman of the Department of Pediatrics, State University of New York College of Medicine at Syracuse. Cloth. Pp. 436. Price $10.00. W. B. Saunders Company, West Washington Square, Philadelphia 5, 1954.

The premise of this book is that children differ qualitatively from adults and thus require a different approach in diagnosis as well as in treatment from that usually followed in the management of the illnesses of adults. This concept is carried further to include the thought that children in one age group may differ markedly from those in a different age group. Neither concept is revolutionary and the present work keeps well within the bounds of what is currently accepted in this connection.

Diagnosis, as the title indicates, is the forte of this book, with treatment mentioned only when it is implicit in the diagnostic procedures in question. The fact that pediatric practice has undergone major changes in the past few years is recognized. Increased attention is paid to problems of growth and development, accident prevention, and chronic illnesses and disabilities.

This book is useful as a quick reference and can be used without major difficulty in conjunction with more detailed texts. It should be invaluable to those who encounter any important number of diagnostic problems in children.

HEART DISEASE AND INDUSTRY with particular reference to Workmen's Compensation cases. By Meyer Texon, M.D., New York City. Cloth. Pp. 324. Price $7.50. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1954.

This book is thought to be the first in which the relationship of heart disease to industrial problems, particularly in reference to Workmen's Compensation cases, is extensively explored. The author makes a surprisingly successful effort to outline the requirements of proof of cause of cardiac disabilities and their application in actual practice. An outline of the methods of study is given, followed by reports of one hundred representative cases of heart problems in which Workmen's Compensation was involved. A third section of the book is devoted to discussions of coronary occlusion and other cardiac pathologies, rehabilitation of cardiac patients, problems of Workmen's Compensation, the scientists's point of view, law-science relationships, interpretation of an accident, and other pertinent topics.

BRITISH OBSTETRIC AND GYNECOLOGICAL PRACTICE. Vols. I and II. Edited by Sir Eardley Holland, M.D. (Lond.), F.R.C.P., F.R.C.S., F.R.C.O.G., Hon. M.D. (Dublin); Hon. LL.D. (Birmingham); Hon. LL.D. (Leeds)); Hon. F.R.C.S. (Edin.); Consulting Obstetric and Gynecological Surgeon, London Hospital; Late President, Royal College of Obstetricians and Gynecologists; President XIIth British Congress (1952); Hon. Fellow, American Gynecological Society; Corresponding Member, French and German Gynecological Societies; and Aleck Bourne, M.A., M.B., B.Ch. (Cantab.), F.R.C.S., F.R.C.O.G.; Consulting Gynecologist, St. Mary's Hospital, London; Consulting Obstetric Surgeon, Queen Charlotte's Hospital; Consulting Surgeon, Samaritan Hospital for Women, London. Cloth. Pp. 2022, with illustrations. Price $29.50. F. A. Davis Company, 1914 Cherry St., Philadelphia 3, 1955.

The traditional conservatism of the British is obvious in this treatise, but it does not amount to backwardness. The work comprises two volumes, one devoted to gynecology and the other to obstetrics. Both are compilations of material produced by leading specialists in the field in various medical centers in the British Isles.

The volume dealing with gynecology covers its every aspect, including medical, surgical, and psychiatric treatment. It also gives a comprehensive survey of the anatomy and physiology of the female reproductive tract. A well-developed discussion of medicolegal problems in gynecology contains much that is of value to the American doctor, but it must be approached with the realization that the differences in the legal systems of the two countries make a portion of it inapplicable in this country. The obstetrics volume gives a discussion of the anatomy, physiology, and pathology of pregnancy and delivery on an academic basis as well as adequate descriptions of methods of handling obstetrical problems in practice.

Much of the material, particularly as regards technic, is almost identical with what would be found in books written in the United States, but there is sufficient difference to make the publication of this work well worth while. A most obvious difference is the use of spelling to which we are unaccustomed (for instance, the retention of the "ae" in words of Greek origin where the practice in the United States is to shorten it to "e").

Less obvious but more important is the difference in point of view. Some difference must inevitably arise from the great contrast between the circumstances of practice in Great Britain and in the United States. It seems obvious that a tax-paid structure of medical practice must cause some divergence from procedures enforced and allowed in our "private enterprise" system. It is also obvious, in this case at least, that British practitioners represent a somewhat more conservative point of view than we are accustomed to in this country, although they are by no means recalcitrant about adopting new views and technics when their worth has been demonstrated.

DOCTOR AND PATIENT. By Desmond O'Neill, M.D., M.R.C.P. (Lond.), D.P.M. (Eng.), Physician, Department of Psychiatry, St. Mary's Hospital, London; Psychiatrist, Chelsea Hospital for Women; Clinical Assistant, Department of Psychological Medicine, University College Hospital. Cloth. Pp. 197. Price $5.00. J. B. Lippincott Company, East Washington Square, Philadelphia 5, 1955.

This book is a compendium of clinical observations including specific cases backing up the author's contention that the truly successful physician is one who knows his patients, both physically and mentally. The author's major generalization is that "tensions produce in certain people disorders of physiological function and later disorders of structure."

The stress symptoms with which Dr. O'Neill is concerned are those seen by the doctor in daily practice, which do not fit into "the neat, distinct pattern he has been taught to look for." Dr. O'Neill is very concerned that the patient receive therapy which goes beyond treating symptoms. He does, however, discuss a variety of syndromes of stress symptoms including fever, overeating, undereating, fatigue, itching, et cetera.

"The doctor can impart faith and confidence with very few words, by an attitude more than what is said," explains Dr. O'Neill. It seems that all through the book the author is suggesting that physicians take their time and develop the ability to see the paradoxes which occur in the area of stress disorders.

The author feels this book concerns matters seldom learned in medical colleges. Any patient reading this book would hope his doctor would do likewise. It is well organized and has an excellent bibliography of publications on stress disorders.

ION EXCHANGE AND ADSORPTION AGENTS IN MEDICINE. The Concept of Intestinal Bionomics. By Gustav J. Martin, Sc.D., Research Director, The National Drug Company, Philadelphia. Cloth. Pp. 333, with illustrations. Price $7.50. Little, Brown & Company, 34 Beacon St., Boston 6, 1955.

This book is essentially a discussion of a concept of intestinal bionomics and is the product of some 10 years of research into the medical use of ion exchange materials in this connection. It is the contention of the author that chronic degenerative diseases are at least partly caused by prolonged bombardment of the gastrointestinal tract by toxic materials ingested with the food or produced in the digestion of food. To date, this concept has been neither proved nor disproved. Dr. Martin has apparently been able to demonstrate that ion exchange resins and possibly other materials are capable of absorbing toxic material in the gastrointestinal tract and so make them unavailable for nefarious effects on the body; he believes that this is a valuable prophylaxis against degenerative diseases; he does not claim that this has any curative effect in cases where pathology has already been established.

The agents discussed in the text include anion and cation exchange resins, nonresinous ion exchange and adsorption materials, and chelating agents. Their use is discussed in connection with peptic ulcer, diarrheas, and sodium retention, all well-established uses, as well as in less well-established fields. A chapter is devoted to a discussion of the concept of intestinal bionomics.

CURRENT THERAPY 1955. Latest Approved Methods of Treatment for the Practicing Physician. Edited by Howard F. Conn, M.D. Cloth. Pp. 692. Price $11.00. W. B. Saunders Company, West Washington Square, Philadelphia 5, 1955.

The seventh edition of this series is designed to carry on the original purpose—"to bring to the busy practicing physician the information necessary for the complete management of the patient."

Dr. Conn and his twelve consulting editors have compiled the material of nearly 300 contributors, a large number of them new, into a concise, ready working reference of sixteen general sections. Treatment methods are described briefly, but with complete coverage of the term of therapy.

Many important additions have been made, while some valuable information from the previous volume has necessarily been repeated, offering an elaboration of knowledge about new therapeutic agents, including undesirable toxic or side effects, proper precautions to be observed, and particular or specific effectiveness.

In some cases more than one method of treatment is presented for a disease, showing different views of therapy or different conceptions of the disease, but all are considered the opinions of recognized authorities and tend to enhance the value of the book.

THE DIAGNOSIS AND TREATMENT OF CONVULSIVE DISORDERS IN CHILDREN. By Samuel Livingston, M.D., Assistant Professor in Pediatrics, The Johns Hopkins University School of Medicine, Physician-in-Charge, The Johns Hopkins Hospital Epilepsy Clinic and Electroencephalographer, The Johns Hopkins Hospital Laboratory of Electroencephalography; Associate Attending Physician in Pediatrics and Assistant Physician in Medicine, Sinai Hospital, Baltimore, Maryland. Cloth. Pp. 314. Price $9.50. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1954.

The diagnosis and treatment of epilepsy makes up the bulk of the material presented in this text, but other convulsive disorders are given consideration. This book is, in part, an outgrowth of a bequest made in 1939 to The Johns Hopkins Hospital by Mrs. Harriet S. Lederer for "investigation in the cause and cure of epilepsy." There are chapters on the Social Management of Epilepsy and Surgical Treatment of Epilepsy. A fairly comprehensive survey is made of anticonvulsant drugs, discussing their general properties, indications, dosages, and untoward reactions.

PRACTICAL ENDOCRINOLOGY. By Lewis M. Hurxthal, M.D., Head of Department of Internal Medicine, Lahey Clinic; in cooperation with A. Seymour Parker, M.D., Physician, Department of Internal Medicine, Lahey Clinic; and Hirsh Sulkowitch, M.D., Research Associate, Lahey Foundation. Cloth. Pp. 318, with illustrations. Price $7.00. McGraw-Hill Book Company, 330 W. 42nd St., New York 36, 1955.

This book is one of a proposed series of "Handbooks For The General Practitioner" in which the aim is the presentation of material that usually lies in specialty fields with a minimum of theory and a maximum of practical application. In this particular book the aim has been quite well carried out. The general practitioner should find it easy to use, but the minimizing of theory may make it necessary for him to turn to other texts if he wishes to obtain a more than superficial understanding of the endocrinopathy with which he is dealing. The index is not as complete as would seem desirable in a book intended for quick reference use, but the Table of Contents is more detailed than is usual. The writing is readable, concise, and clear, with an intensely practical orientation.